Railway Age Gazette

Including the Railroad Gazette and the Railway Age

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE, BY THE RAILROAD GAZETTE (Inc.), 83 FULTON ST., NEW YORK.

CHICAGO: 417 South Dearborn St. CLEVELAND: New England Bldg.
LONDON: Queen Anne's Chambers, Westminster.

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Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico	$5.00
Canada	6.00
Foreign Countries (excepting daily editions)	8.00
Single Copies	15 cents each

Shop Edition and the eight M. M. and M. C. B. Convention Daily Issues, United States and Mexico, $1.50; Canada, $2.00; foreign, $3.00.

Engineering and Maintenance of Way Edition and the four Maintenance of Way Convention Daily issues, North America, $1.00; foreign, $2.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 51 SEPTEMBER 1, 1911. NUMBER 9.

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AN energetic station agent or yardmaster, if given a free hand, could often economize labor or material to better effect than could the superintendent; and likewise the superintendent, if not held down so rigidly to estimates made, months previously, by his superiors, could manage his division more economically than is possible under regulations that must be rigidly uniform throughout a dozen divisions. A recognition of these truths leads one to sympathize with "Yardmaster," whose letter we print in another column. It is true, as he says, that if the officers were to give the station agent suitable authority they could see his ambition set him to thinking, to the benefit of the company in many cases. At the same time, we are bound to offer an excuse (not a defense) for the management. The manager is fearful, and with good reason, that too many of these subordinates will prove to be small-size men. He would find that to get the results promised by our correspondent he ought to have begun five years back, with educational processes. The agents, foremen and others must learn to do by doing, and that is costly. Still, that is the way in which all of us have to learn most of the useful arts of life. However well the general office does its work, there will always be room for the exercise of judgment and executive ability in the station, the yard and the small shop; and, given the right men—men who have been trained to think since 1906—an efficiency scheme of 1911 not only need have no antagonism to this idea of local initiative, but it can join hands with and make use of it. Our correspondent must remember another thing. He sees waste, and criticises the officers for not stopping it. But the labor leaders are criticising the same men because they do stop waste. Yard engines are not always idle waiting for way bills; sometimes the idleness is due to the brotherhood's "agreement"; it is an instrumentality for increasing pay, like the full-crew law. The yardmaster who sets out to economize will find that unenterprising officers are not his only antagonists.

A BULLETIN of the Bureau of Railway Economics shows that railways operating 60 per cent. of the mileage of the country had 1,069,570 employees on their payrolls on April 30, 1910, and only 987,790 on April 30, 1911. This was a reduction of 81,780, or 7.6 per cent. The number per 100 miles—there being meantime an increase in mileage—declined from 777 to 707, or 9 per cent. The bulletin mentioned is given elsewhere. It has been charged by some that the retrenchments reflected in these figures have been made in retaliation for the decisions of the Interstate Commerce Commission refusing to let the railways advance their rates. There are other much more probable causes for them. During the fiscal year 1910 business was good. The railways, therefore, increased the number of their employees to 1,699,420, or 196,597 more than the number in the fiscal year 1909. Toward the end of the calendar year 1910 earnings began to fall off. The decline became marked in the early part of 1911. During the first four months of the calendar year, ending April 30, operating revenues of all roads declined 3.6 per cent. Operating expenses decreased 1.1 per cent., with the result that net revenues declined 9.6 per cent. The decision of the commission told railway men that they could not get more net earnings by increasing rates; and, naturally, they sought to accomplish the end through reductions in expenses. The decline in business resulting in reductions of gross earnings had as much to do with the retrenchment policy as did the decision. The decline in earnings continued through May. In that month total operating revenues decreased $4,355,000, or 4.4 per cent., as compared with the same month of 1910. During the first five months of the present calendar year operating revenues of all roads declined 3.8 per cent., and net revenues declined 8.5 per cent. For the 11 months of the fiscal year ending May 31, there was a decrease of operating revenues and an increase of expenses resulting in a reduction in net revenue of 7.4 per cent., in spite of the fact that there was meantime an increase in the mileage operated. Concurrently with these reductions in earnings have gone on the

reductions in force. It is an interesting question what effect on the condition of the properties these retrenchments are having The railway managers resented Mr. Brandeis' charge that the roads are inefficiently managed. Nevertheless, he stimulated them to diligence in seeking places to effect savings. Many of the economies that have been made have resulted from this and have not involved any impairment of the service to the public or deterioration of the properties. On the other hand, some retrenchments have been made which have affected service and the physical condition of the properties. But railway managers, like all other prudent business men, have to cut their coat according to the cloth. The Interstate Commerce Commission told them they should get increased revenues by greater economy in operation instead of by increases in rates; and they are doing it.

THE National Highways Protective Association is keeping a record, made up from the daily papers and kept as complete as possible, of all grade crossing accidents occurring in New York and New Jersey; and, of course, it finds the number appalling. This action, laudable in its motive, can hardly be of much value except to make plain its own uselessness. In other words the problem of grade crossing safety is of such magnitude and gravity that only the most heroic measures are adequate to its settlement. Statistics may almost be said to have lost their virtue. The facts which the association proposes to make public afford not the slightest enlightenment beyond what is already available in the state commission reports. That indefinable body called "the public" may read a few harrowing details which it has hitherto ignored; but it must be that the public's agents, the legislators, know their duty already, for the appalling figures showing the heavy totals of deaths and injuries at crossings have been laid before the legislatures of New York, New Jersey and the other populous states each year for a long time. What is to be done with this widespread and depressing problem? As in the case of the trespasser nuisance, the problem would undoubtedly be much nearer solution if the larger and more powerful body, the state, could assume the functions of the towns and cities in crossing removals. Massachusetts and New York have taken progressive action; but in both states the municipalities still bear a share of the burden, and the inability or unwillingness of these to shoulder even a small part of the heavy cost of grade changes is a principal obstacle in the way of reform. Interminable litigation or negotiations between railways and cities are at this moment the continuing causes of perpetual dangers at many crossings. At Worcester, Mass., the new union station, just completed, marks the close of a crossing campaign that has lasted a dozen years or more. To further shift local tax problems and governmental rights from the town to the state admittedly would be difficult, if not impossible; we do not know but the plan would encounter constitutional prohibitions. But if a state may rightfully build highways and costly bridges, why not pay for abolishing railway crossings? So far as the railways are concerned, there ought to be an advantage in dealing with a single body throughout a hundred miles of line rather than with a score of governmental units. But, whatever may be the difficulties and doubts concerning changes in the law, there can be no doubt that as things are under the present regime, the only force that has much power to hasten crossing improvements is the force of the tragedies that occur every now and then. Logically, improvements will not proceed much faster unless the tragedies shall come to be more frequent and more shocking.

IT is to be noted with satisfaction that the persistent efforts of a small group of railway gardeners to interest the railways of the country in the work of improving the appearance of station grounds and right of way land are meeting with increasing success. About 30 members of the Railway Gardeners' Association were present at the annual convention, which was held a short time ago in Chicago, and the meeting was marked by interested discussion of the technical phases of gardening. This association was formed in 1907 with 17 members. It has since held four conventions, and the membership has increased to 150, representing 35 roads. This progress is entirely due to the efforts of individual employees who are anxious to see the practice of horticulture on railway lands gain the recognition which it deserves. Although several roads have maintained departments for carrying on such work, the gardeners in charge have in the main been denied encouragement by railway managers in enlarging the field of their work and in introducing it on new roads. An expenditure made for planting flowers or sodding a cut may not result in as definite an increase in gross earnings as a similar expenditure for operating a freight train. However, the appearance of well kept parks and flower beds at stations, of neatly sodded banks in deep cuts and of fresh flowers on dining car tables are very effective in adding to the pleasure and comfort of travelers, and any such effort of a railway manager to please his patrons will win for his road many friends who not only will travel that way more often in the future, but will also influence their friends to go with them. Such a body of friendly patrons is also of great value to the road in preventing radical and ill-advised legislation. The roads which have practiced gardening have also found that the products of the gardener's work have a good influence on employees in making them more contented and in influencing them to be more careful in their work, which usually means that they are saving the company money. The sodding of cuts has the further argument in its favor that it prevents washing, thereby reducing maintenance costs, and the maintaining of station parks can be justified on the ground that without proper surroundings the value of a well-designed and costly station is considerably depreciated. The fact that some of the roads which first adopted gardening are now the most ardent advocates of the system is the best proof of the value of the investment. Several methods have been devised by railway gardeners materially to improve the appearance of the right of way at very small cost, the most common method being to offer prizes to station men, flagmen and tower men for their efforts along this line. Many other means of improving existing conditions are being devised, and the members of the Railway Gardeners' Association are taking the lead in this commendable work.

THE SUSTAINING POWER OF PASSENGER TRAFFIC.

THE Interstate Commerce Commission's returns for 1910, which we have heretofore printed, show the sustaining power of the railway passenger business of the country, not only absolutely but as compared with freight. Repeating some of those returns very briefly, they show in passenger miles per mile an increase, since 1901, of 54 per cent., as compared with 43 per cent. in freight ton miles per mile; and even during the panic period, 1907-8, they increased about 5 per cent., while freight business decreased nearly 8 per cent. The persistency of comparatively good passenger business as contrasted with freight in a period of business depression may indeed be accepted as a normal fact as well as its stronger sustaining power in general as established by the records of the last decade. It shares in this respect somewhat the same quality as the street railways, though in less degree. Hard times in business admittedly hits the freight business first, particularly that branch of it that covers factory products; passenger traffic is affected later and often only after a considerable interval. Yet, on the theory that business travel should go with business itself, one would think that the upward and downward curves of freight and passenger traffic should correspond pretty closely.

The seeming anomaly of a disparity between the two is deepened by the fact that during the last decade there have been some special and familiar forces operating adversely to passenger traffic. During that period the long distance telephone has come in more and more as a commercial and industrial coefficient. It has reduced what, but for it, would obviously have been a large volume of railway travel and, it may be remarked, as an

efficient agency of business it must have promoted the freight traffic that profits by every new aid in production. Incidentally, it has affected that active class, business and professional, that before its use traveled more. To it is to be added the automobile, likewise affecting a wealthy group of habitual travelers; and, finally, there has been the extension of competing street railways, using the term to include cross-country and long-distance lines.

Taking up these forces, originally or now giving service similar to steam railway travel, the long distance telephone has had hardly a perceptible qualifying feature. Now and then it may enable Brown to notify Smith to make a railway journey, but in the vast majority of cases it is a preventive; and its remote stimulus of railway travel is so small as to be negligible. Not so, however, with the parallel street railway. At first an active and serious rival of the steam line, it has now, apparently, taking the country as a whole, become, in its secondary stage, a feeder. A small rival still between near together stations of the steam line, it has grown more and more to be a feeder from farther points. Its rivalry has been sunk in its character as a subsidiary, saying nothing of the larger values of the electric line as a direct lateral and its facilities for focussing travel at the urban station. The automobile has the same duplex character of feeder and rival. It competes with the steam line at many points and often on long distances, but it also brings the home, the shop and the store in closer touch with the station. The rural home of wealth, formerly remote, is now hardly, by figure of speech, per automobile, across the street from the steam railway. The maxim that "travel makes travel," may prove as true in the relations of the automobile to the steam road as in the case of the trolley.

But there have been more positive elements of support in the passenger traffic. One has been the progressively increasing wage of the laboring classes. During the last decade, but especially since 1906, the higher wage has undoubtedly increased what may be called the traveling potentiality of the great wage-earning group. Its railway journeys may not be long nor individually many in number. But the size of the group makes a small percentage of increase large when expressed in passenger miles. Another influence, and perhaps a prime factor, in sustaining passenger traffic is the swift growth of the American city and large factory town as compared with the country districts. That it is the active center of population with its intensive and varied affairs that fills the passenger train relatively rather than the rural station stands with the assertion. Finally, there are forces more subtle and obscure that sustain and increase the passenger business. It would be interesting could we measure the higher railway comforts of the traveling public, the temptations of lower fares, expressed more specifically in the mileage book, the increased habit of travel bred by wealth and luxury. They are minor components, but they are there.

THREATENED STRIKE OF RAILWAY SHOP EMPLOYEES.

IT is only a short time since railway officers felt they were through for a while with negotiations and arbitrations about changes in wages and conditions of employment. They have made settlements with all classes of their organized employees; and business conditions did not seem to invite new demands. But now the press teems with reports of strike votes by employees in the shops of western roads. The main storm center is on the Harriman Lines. The various roads belonging to the Harriman system have, individually, contracts with the individual organizations of their shop employees. These provide that if either party desires their revocation 30 days' notice shall be given. Without giving the stipulated notices, the shop employees have demanded that the railway managers recognize a new federation of the various organizations of shop employees. The officers of some railways have done so. Those of the Harriman Lines have refused. They believe that contracts with the employees of each road should be made by that particular road; that recognition of the federation would give to it and its leaders excessive power, enabling them, perhaps, to tie up the whole system of 18,000 miles, because of grievances of men in one organization on one road; and that, in any event, they should not be asked to make contracts with the federation while they have contracts with the individual organizations.

Spokesmen for the employees say all they wish now is recognition for the federation. But they wish it as a means to certain ends. What those are is indicated by the proposed rules governing shop employees which they intend to press on the officers of the Harriman Lines through the federation if it shall be given recognition. These proposed rules were given in the *Railway Age Gazette* of August 25, 1911, page 383. Nine hours are now a day's labor in the shops of the Harriman Lines. It is proposed that this shall be reduced to eight hours, and that all mechanics, apprentices and semi-skilled men and helpers shall be granted a 7-cent flat increase per hour. Mr. Kruttschnitt says this would mean an increase in pay of 23 per cent., and a reduction of hours, etc., amounting to 13 per cent. more. It is further proposed "that no employee shall work by piece premium or bonus system. Where same is now in existence it shall be discontinued upon the signing of this agreement." A few months ago Mr. Brandeis, before the Interstate Commerce Commission, held the railways up to scorn because they had not generally applied the principles of "scientific management." He said that if they would do so they could save $1,000,000 a day. Press and public accepted this view, and the railways were roundly criticized for inefficient management. The most important feature of so-called "scientific management," is the payment of wages by the piece, premium or bonus system, the object of which is to reward each employee according to his merits, and thereby increase the average amount of work done, increase the wages received per employee, and, at the same time, reduce the expense of operation to the company. If the payment of wages according to the merits of individual employees be a feature of true scientific management, the shop employees of the Harriman Lines are threatening to strike to establish the principle that scientific management shall not obtain in railway shops.

Another rule demanded is that, "employees shall not be requested to undergo any form of physical examination or make out any form of personal record." The purpose of physical examinations is to test the physical competency of applicants for employment. In case of accident in its shops the railway is liable in damages to the person injured. The proposed rule is in effect a demand that the railway shall not make rules which will protect it against the results of employing incompetent workmen. The object of requiring the filling out of personal record forms is to enable the management to ascertain where candidates for employment have worked, what their experience has been, and why they have not stayed where they have been employed. To demand that railway managements shall not look up the past of prospective employees is to demand that they shall deliberately abstain from getting information as to their character and their fitness for employment.

Another proposed rule is: "Employees injured or becoming sick while in the service shall, if necessary, be sent to hospital for treatment, such treatment to be given free of charge as long as the patient and members of this organization think he requires it." The physicians in the hospitals are to have nothing to say about how long an employee requires medical attention. That is a point to be determined by the man's conscience and the vote of his union. If his conscience and his union decide that he shall be kept free and given gratuitous treatment for ten years the company is to have nothing to say about it but to pay the bills. It is further proposed that "employees shall be given equal membership on the board of directors of the hospital department." In other words, while employees are to be treated at the expense of the company, the employees are to have as much to say about the management of the hospital department

as has the company. This demand is almost as sweetly reasonable as the one that employers shall desist from the impertinance of inquiring into the pasts of applicants for work.

In the years 1899-1909 the wages of machinists employed on American railways increased over 30 per cent.; those of carpenters, 20 per cent.; and those of other shop men, over 23 per cent. How much they increased in 1910 over 1909 is not known. A bulletin of the Bureau of Railway Economics shows that the increases in the daily wages of all shop employees of the Atchison, Baltimore & Ohio, Chicago & North Western, Illinois Central, Northern Pacific, Pennsylvania, Southern and Union Pacific averaged 5.58 per cent. between 1910 and 1911. These lines have a total mileage of 47,500 miles located in all parts of the country, and the figures for them may be considered representative for all roads. Therefore, since 12 years ago, the different classes of the employees in railway shops have received increases in their daily wages of at least 25 to 36 per cent.

It is quite probable they would be satisfied at present with much less than they ask. It is quite probable, too, the railway managers will refuse to give them anything. There has been a feeling among railway managers for some time that they must soon make a firm and courageous stand against organized labor. There is no class of organized labor against which they could better afford to make this stand first than that employed in shops. A complete shut-down of the shops would not for some time interfere with train operation, and a partial closing would not for a still longer period seriously interfere with it. As work in the shops is similar to that in more other lines of business than any other work on a railway, it would be easier to fill the places of striking shop employees than those of most other classes of labor. The western roads are especially disinclined to do anything now which will increase their labor bills because the Interstate Commerce Commission has just ordered reductions in their rates, the full effect of which no one can foresee. If there was a strike in the shops and the railways won it, they would have an opportunity to introduce efficiency methods in many places where they would be loathe to introduce them if they knew the certain result would be to provoke a walkout. On the whole, therefore, the managers probably are more disposed to make a firm stand against the demands of the shop employees than they have been to resist any similar ones for some years.

NEW BOOKS.

Proceedings of the International Railway Fuel Association. 238 pages, 6 in. x 9 in. Secretary D. B. Sebastian, Chicago, Rock Island & Pacific, La Salle street station, Chicago. Price: Morocco, 75 cents; paper, 35 cents.

The third annual convention of this association was held in Chattanooga, Tenn., May 15-18, 1911. Among the more important papers presented and discussed at the meeting were those on the testing of locomotive fuel; the railway fuel problem in relation to railway operation; petroleum—its origin, production and use as a locomotive fuel; and the organization of a railway fuel department and its relations to other departments. An account of this convention appeared in the *Railway Age Gazette* of May 19 and 26. The proceedings also contain a list of the members, and a copy of the constitution and by-laws.

Mechanical Engineering. By Charles M. Sames, B. Sc., Jersey City, N. J. Revised and enlarged. 210 pages, illustrated. Bound in flexible leather, 4 in. x 6⅝ in. Price, $2.00.

This is a convenient pocket hand-book containing data for the mechanical engineer. Printed in small type, it gives brief, instructive notes on many subjects. It is of value to only those having a mechanical training and contains formulæ, tables and information covering mathematics up to trigonometry, the strength of materials, structures and machine parts, energy and the transmission of power, heat and heat engines, hydraulics and hydraulic machinery, shop data and electrotechnics. Of course, as the size of the book is small the information on the subjects considered is limited, but a sufficient amount is given to meet the needs of the experienced engineer. A valuable feature of this book is the number of items covered in such a small space.

Letters to the Editor.

WIDE FIREBOXES.

New York, August 21, 1911.

To the Editor of the Railway Age Gazette:

Henry F. Colvin is entirely correct in his statement in your issue of August 18, page 312, that a wide firebox engine, as he defines it, i. e., one having a firebox extending over the driving wheels, was used in 1863, and engines complying with his definition, including the French locomotives illustrated in Colburn's Locomotive Engineering, pages 89 and 90, to which he refers, are shown and described in my paper before the Western Railway Club, pages 104 to 106 of Vol. 8 of the Proceedings, 1895, from which I quoted in my letter appearing in your issue of July 21. The date of construction of these engines is stated in that paper to be 1862.

His failure to fully agree with the statements of my letter is, however, rather a matter of terms than of substance, for the reason that the firebox which I stated was not put into practice until 1877, I also stated to be the wide firebox proper, by which is meant one which is located entirely above the wheels, and extended laterally beyond them for a substantial difference. The fireboxes of the French locomotives do not apparently project more than about 6 in. beyond the driving wheels, and they are described in *Le Genie Industriel* (Vol. XXIV, page 95), as being of a width as much as 71 in. This is less than that of the present medium width fireboxes, and manifestly does not comply with either the terms or the spirit of my reference to the wide firebox proper as being one which is extended beyond the driving wheels for a substantial distance. With entire respect to my friend Mr. Colvin, I therefore cannot admit that I am in error in my statement that the date of the first wide firebox proper was 1877.

J. Snowden Bell.

COLLEGE MEN AND RAILWAY WORK.

Douglas, Ariz., August 12, 1911.

To the Editor of the Railway Age Gazette:

The letters which your editorial on College Men and Railway Work has brought forth have been interesting to me, perhaps because I am not a college man and I may see things from a different point of view.

The one fact that every college man should understand before entering railway work is that the climb to the top is a long, hard pull, though it should be faster to a man with a college training than to one without. I have seen college men enter railway work and realized that they were more capable than I, simply from the mind training they got while in college. I have realized my deficiencies and have had to work all the harder to keep up with the college men. Their advancement would undoubtedly have been faster than mine, but after staying with it for two or three years they have become discouraged and gone into something else which seemed more lucrative. But I don't know of any that are as well off as they would have been had they stuck to railroading.

A college man in railway work sees superintendents and trainmasters well along in years who are greatly lacking in education. What the college man overlooks is that they do understand the art of railroading. To a man who has only been in railway work two or three years, the operation of a railway seems very simple, but let him go into the different departments, the roadway, the mechanical and the operating, and if he isn't inspired by the magnitude of the problems he will be discouraged at the possibility of ever knowing enough to be a superintendent. For an official must know something about all these departments. It may be that the official has not been in each different department, but he has been railroading so long that even in being in only one of the departments all

the time he has acquired knowledge of the others. This is being made simpler and quicker now by the student system that some railways have introduced.

A man entering the employ of a road without experience, whether he be a college man or not, has got to start at the bottom. If he knows more than others at the bottom it will soon be found out, but it will not do a bit of good to tell everybody he knows more. So I can not agree that a railway prefers an office boy in some position to one who may have a college education, but the office boy probably does get along better for the reason that he can not make comparisons between his education and the education of those who have been less fortunate, as "Yale 1894" suggests in his letter printed August 4. But with tact the college man would advance far more quickly than the office boy in the same position, because the college man knows more, and in railway work, as in any other kind of work, knowledge is power.

I believe there is a great need in railway work for college men, perhaps more in the West than in the East. But it is work and lots of it.

R. P. K.

TUSCALOOSA, Ala., August 8, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read with interest the letter published in your issue of July 14, on College Men in Railway Work, signed "1903."

I am really surprised to note the ring of pessimism which pervades this letter, as I have always been of the opinion that there is no field of effort which promises such rich rewards ultimately as that of the railway service, especially to the college graduate whose mind has been trained to think logically, and to whom the numberless problems offered by the transportation business for solution should strongly appeal. That these problems do appeal only in a feeble manner to the college graduate is sadly evident by the small percentage of college men to enter the railway service, as pointed out in an editorial in your issue of June 23. The question why the railway work fails to attract and hold these men, and indeed many bright young men of non-academic training, becomes one of paramount importance, provided it be true that the effect on economical management by having these men in the ranks will be beneficial to the railways.

From the observation of the writer, it appears that many young men, and especially those of college training, make a mistake in the beginning of their career by obscuring from their vision those embryonic principles of railroading which must necessarily be mastered before any substantial advance can be made. Instead of recognizing the necessity of fully mastering these principles, it seems that they are more or less inspired in their choice of a vocation by the romantic stories of the careers of great railway builders—which stories in most cases, unfortunately, fail to catalog the myriad of hardships endured and obstacles overcome—which results in a certain amount of impatience when the visionary is exchanged for the actual.

With the combination of railways, the introduction of improved appliances, the enormous increase in traffic and from many other reasons, the railways have evolved from the homogeneous to the heterogeneous state. The day is past when the division superintendent can personally supervise the operation of his division unaided, and there has consequently grown up for his assistance our traffic, mechanical, engineering, telegraph and signal departments, with boundaries of operation—dependent on the policy of the individual company—more or less distinctly drawn.

Now, in entering the railway service, the new recruit enters one of these departments, or perhaps some other not mentioned. He has now exchanged the visionary for the actual, and the hardships which must be endured and the obstacles which are necessary for him to overcome in order to advance become more and more apparent to him. In his impatience for promotion, engendered perhaps by the false view he held of railroading before actually becoming connected with the business, he falls victim to that fault of human nature which is more or less common to us all: he fails to take advantage of his opportunities. And here is where the real trouble lies. As a general rule, I think that it is fallacious for him to believe that he can make any substantial advance in the business by simply mastering the duties of his individual position. He must not only appreciate the responsibilities of the man above him, but he must get a general conception of the business as a whole; for example, the sources of our enormous traffic, the most economical manner in which this traffic may be handled, the cause and prevention of waste and the innumerable other questions which will suggest themselves as he proceeds with his inquiries. Referring directly to the letter in your issue of July 14: would it not have been more profitable to the writer of that letter if he had taken advantage of his opportunity to acquire information about the various phases of the railway business which presented themselves while traveling around in pursuance of his duties, instead of reflecting upon the hardships of his position in being ordered at "11 p. m. to take the midnight express to X?" It would have served the dual purpose of making him more satisfied with his position and fitting him for some higher place.

The *Railway Age Gazette* is now publishing a series of letters, in one of which a certain system of divisional management is advocated, wherein the division superintendent is absolute monarch in his territory, which is destined to survive the departmental and semi-divisional management of most of our railways. When this time, which is fast approaching, arrives, how can the college graduate, or for that matter any other young man, expect to assume the responsibilities of the head of such a division, not to mention the realization of his dreams, unless he has a more or less thorough practical knowledge of the workings of the various departments?

The principle that a successful railway man must be an expert in one certain department and at the same time have a general knowledge of the workings of the road as a whole is immutable, and the college graduate must realize this fact and work towards this end if he expects to succeed.

I believe that college trained men have just as good chances in the railway business as in other line of work, and indeed can be imported with profit to the railways, if they can be made to recognize this principle. Unless they do, they and other young men are destined to failure, unless they succeed in rising by chance, and that chance is not sure enough for any of us to take.

A READER.

EFFICIENCY WITHOUT A "BUREAU."

SAVANNAH, Ga., August 23, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The discussion now going on in your columns relative to the necessity of the so-called efficiency bureau leads to the inquiry: Is the present division organization securing the best possible results from an efficiency point of view?

In one of his able articles "D. A. D." refers to the period when the superintendent was the "whole thing." With the creation of higher offices the superintendent was shorn of more or less authority as regards increasing forces, salaries and making expenditures, all looking towards economy of operation. What is true as to the superintendent is also true as to agents, master mechanics, and, in fact, all division officers. The result is that such officers are judged as to efficiency by the relation that the total of division expenses *fixed by higher officers* bears to the revenue. There is a reluctance to make voluntary reduction in forces and expenditures by the man directly in charge because of the difficulty of securing authority for increases when the volume of business again makes an increase necessary. In dull periods, particularly as regards clerical forces, material reductions could often be made without in anyway imparing the quality of the work. Any man charged with the

supervision or direction of the work of others should possess, and generally does possess, the ability to direct such operations economically; and if his ability were judged by the direct results obtained in his particular department, *organized on his ideas of economy,* his ambition would be stimulated and he would be devising new means of economical operation, a stimulation impossible under the hard and fast rules now in vogue. Repairs and renewals, whether mechanical, roadway, bridges or buildings, could be conducted most economically during the periods when traffic is lightest, were it not for the enforced relation between expenses and gross earnings. When traffic is lightest, forces are smallest, when traffic is heaviest, forces are largest, and by reason of more interruptions the large force and the small force are very close together as to performance. We all study the weekly and monthly reports of revenues and expenses, but the directors make the appropriations for betterments and dividends on the basis of the annual report. Revenue and company ton miles, freight train miles, fuel consumption per train mile, etc., are all valuable statistics, but the final and only test is the net earnings for the fiscal year.

The master mechanic works a fixed force; so many machinists, so many boiler makers, with helpers in proportion, and this rule obtains all through his department, the maximum always fixed by his superior. At times he has a preponderance of boiler work, and machinists are waiting on the boiler makers, marking time, so to speak; but he cannot lay off machinists and take on boiler makers for the maximum of the latter is fixed; and because of this he retains his machinist force. Next week conditions will probably be reversed and he will need all his machinists. Who will say that he could not effect economies, if he, the man on the ground, were permitted to increase or decrease the force as the work in sight dictated? If operating his own shop would he not do so?

What is the loss, expressed in dollars and cents, in a terminal because of an insufficient number of car inspectors? How many hours does the two-dollars-an-hour switch engine wait on the blue flag controlled by the twenty-cents-an-hour car inspector?

How many hours are wasted by the same switching crew because of "no bill" cars? The station agent tells you he is waiting authority to put on an additional bill clerk at perhaps three dollars a day.

The section foreman runs out of ties. Does he reduce his force? No; he can always clean up station grounds, even if he did the same work a day or two before. He is not allowed to carry his lost days forward from month to month. The superintendent who instructed his track forces to burn right-of-way in wet weather was only following this line of education.

We have reached the point where the initiative is denied the division officer, the agent, and the foreman. Some one higher up must vote on the proposition always, and in most cases the opportunity has passed before the authority is given.

The superintendent in charge of millions of dollars' worth of property is surely competent to judge of the necessity for additional help on his division. His corps of assistants, trainmaster, master mechanic, division engineer, road master and chief despatcher constitute a better posted efficiency bureau, if clothed with the authority, than the $100,000 proposition submitted in your recent issue.

Following down this line, the station agent, responsible for the funds, the proper rates and charges, the care of, and prompt forwarding and delivery of freight, certainly has the executive ability to determine what force is necessary to handle his department properly. If given that authority, would not his ambition start him to thinking out economies in the administration of his station? Charge against his pay roll (and don't forget to include stationery and station supplies), not the revenue, which he cannot control, but the tons handled in and out, then note how he wakes up and devises ways and means to reduce his ton cost. As it is now he is often forced into extravagance. He loses an experienced clerk, or warehouseman, and engages a green man to fill the place at the experienced man's salary, and teaches him his duties. The new clerk is not worth as much as the former clerk, but the pay for the position is fixed; if it is reduced the reduction is permanent, so we pay the experienced and inexperienced man alike.

Charge against the master mechanic's pay roll, his engine performance based on the mileage made per engine, give him a free hand in his shop organization, permit him to increase his forces when business is lightest and engines can best be spared from service; then watch the results.

Tell the car foreman that his inspector force should be based on the number of cars moved through the terminal; that a ratio must be observed between the output of the repair tracks and the "bad orders" from day to day; would there not be a visible saving in per diem on cars?

The yardmaster's force of yard clerks should be kept proportionate to the number of cars he is handling. The two-dollars-an-hour switch engine should no more wait on the yard clerk than it should on the car inspector. How often could a yard engine be cut off by employing an assistant yardmaster at one-sixth the cost? Give the yardmaster a chance, tell him the size of his force is up to him, clerks and assistants as well as locomotives, and see what he will do with the "cost per car handled."

Terminal overtime is the least excusable of all transportation charges, yet it is due absolutely to insufficient, or inefficient, yard forces. It originated because trainmen were inexcusably delayed in terminals. It continues because of failure to correct those conditions. One hour's delay will pay a yard clerk for a day. The efficiency bureau is not necessary to uncover such things. We know that they exist.

If the chief despatcher understands that a certain average mileage per train per hour is expected of his department, that the number of operators and their distribution in order to obtain that average, or better, is his responsibility, what will be the savings in overtime of train and engine crews? How much more traffic can be handled by reason of his being able to get power in position promptly? How much per diem would be cut out? These questions are not unanswerable. They should be attacked at close range.

If each department, each station were charged directly, as a part of the running expense, with all supplies and stationery used, how much could we not save each year?

The "stove committee" has been much abused, but the term is only a relative one, and does not necessarily mean the "shacks" or "tallow pots." Such committees meet not only in the sand house, but in the general office also; they know the game, and the alumni are now occupying president's and general manager's chairs, and we are all of us, according to temperament, more or less active members.

The man on the job 365 days in the year is certainly in a better position to judge of what is needed than the investigator who can spend only a limited time at any particular point, and who must of necessity theorize as to conditions he cannot see.

All the efficiency bureau could hope to find would be a weak division, or a weak officer, possibly weak constitutionally, possibly weak because of lack of authority; and who would finally be the arbitrator? Who would decide as to whether the weakness existed in the investigator, or the investigated? Why not give us, the men on the ground, a chance to do some of these things before calling in the highly expensive (and possibly highly ornamental) efficiency bureau?

YARDMASTER.

Dr. Glombinski, after a very short term as railway minister of Austria, resigned, and was succeeded by Chevalier Victor von Roll, who has spent his life in the state railway service, latterly at the head of the commercial service, and is widely known as author or editor of important railways works, among them an encyclopedia in five volumes, which was an extremely convenient work of reference, though now somewhat antiquated.

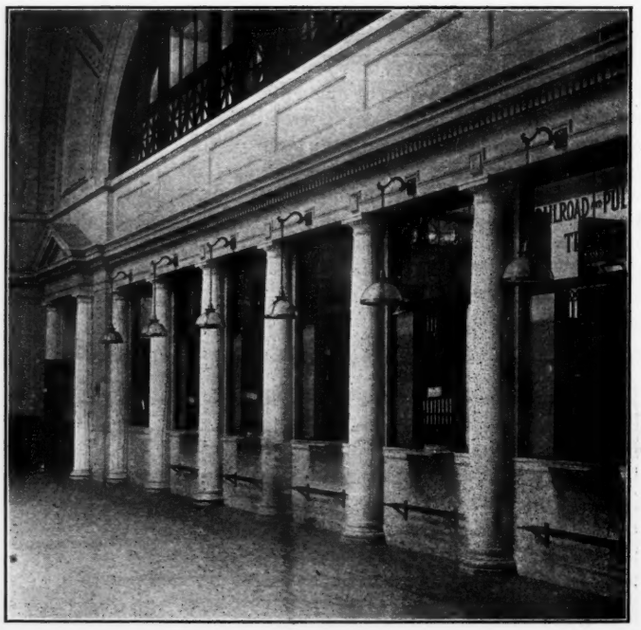
WORCESTER UNION STATION.

The new Union Station at Worcester, Mass., is now in use, the structure having been completed in July, except for a few details at the east end, which await the decision of certain questions connected with the utilization of the old station. The new station was begun over two years ago, and the plans for it were shown in the *Railroad Gazette* of March 13, 1908. As will be recalled from the ground plan, then given, the station occupies a triangular plot facing on Front street, at the west side of Washington Square, the old station having been on the east side of the same square. The main tracks of the Boston & Albany lie on the south side of the station and the "viaduct" tracks on the northwest side. The viaduct, formerly used as a freight connection between the Boston & Maine on the north and the Boston & Albany and the New York, New Haven & Hartford on the south, now carries five tracks, and these are the main platform tracks for the Boston & Maine and the New York, New Haven & Hartford. The lines of the New Haven road approach from the west parallel to and on the south side of the Boston & Albany, so that all New Haven trains have to cross the Boston & Albany main tracks to reach the station. The plan made three years ago has been carried out substantially as then shown, except in a few details. The restaurant is at the east side of the waiting room and the smoking-room extends southward to the vestibule leading to the main entrance to the viaduct tracks. The construction of this station was a part of an extensive scheme for the elevation of tracks to abolish grade crossings, and the tracks on both sides have been elevated so that they are now on a level with the second floor of the station.

Union Station at Worcester, Mass.—Looking Southeast.

A view of the main facade of the station is given above. The towers, which constitute the distinguishing feature of the structure, are of white marble, extending 175 ft. above the street level. The three arches of the main entrance are buttressed by Ionic columns and the marquise which hangs over the doors is 100 ft. long. Below the marble of the towers the material is terra cotta and granite. On the front of each of the towers is a projecting balcony beneath which is a lion's head.

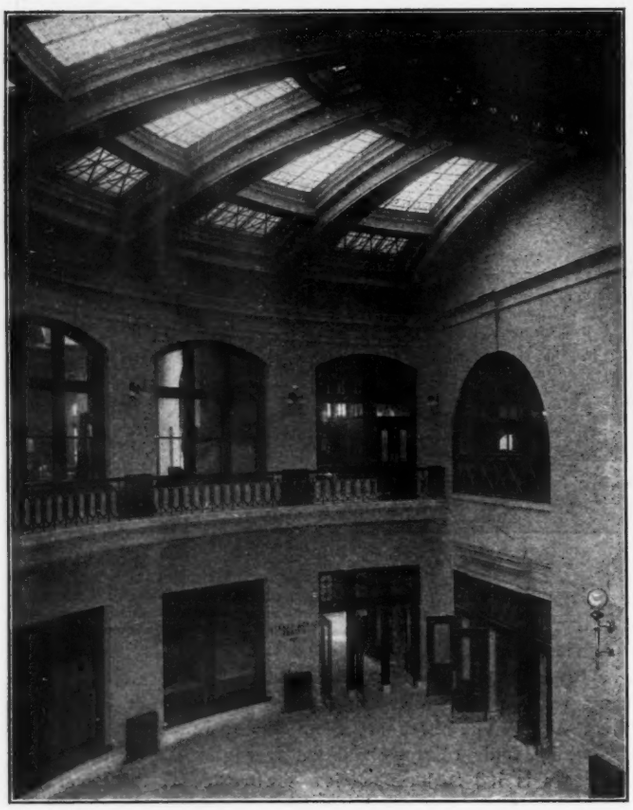
Worcester Union Station Looking Southwest—Tower of Old Station at the Left.



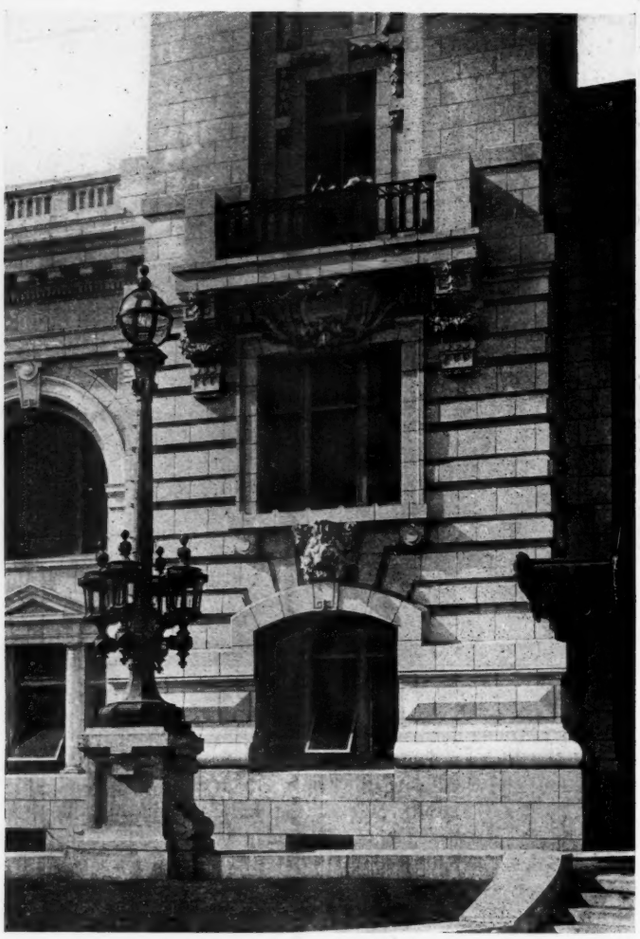
West End of Main Waiting Room.

These details, which give a marked richness to the general effect, are shown below.

In the general view of the station, in which the observer is looking southwest, the viaduct curved tracks with canopy sheds over the platforms, appear at the right, and a



Corner of Main Vestibule.



Detail of Tower.

glimpse of the Boston & Albany's tracks and platform sheds may be had at the left. The tower in this picture is that of the old station built in 1874-5. A picture of this station and tower was given in the *Railroad Gazette* of December, 18, 1875. Washington Square, in the foreground of this view, is now the subject of lively discussion in the Worcester city council and in the newspapers, proposals having been made to carry out extensive plans of beautification.

The main waiting room, which is shown below, is 128 ft. long x 80 ft. wide. In the view the observer is looking northwest, facing the ticket office. At the right of the ticket office are the telephone booths, and at the left is the main exit to the viaduct tracks. On the right of this room are the main entrances from the street, and on the extreme right of the picture is a florist's booth. The main vestibule is 100 ft. long x 20 ft. deep; the walls are of cream colored brick, with a dado 7 ft. high of Vermont marble. The offices on the upper floor of the station are reached by marble stairways at either end of the vestibule.

Worcester Union Station, Waiting Room—Looking Northwest.

To one who judges by the pictures alone it is necessary to consider the size of the main waiting room, which is nearly two-thirds as large as that in the South station, in Boston, in order to get an adequate idea of the building as a whole, for the exterior front view is somewhat deceiving in this respect. The great elliptical arch is made up largely of three long panels of stained glass of light tints, softening the sun's rays, yet lighting the room thoroughly. In the center panel appears the coat of arms of the Commonwealth of Massachusetts. The walls of this room are of soft tinted caen stone, with a marble dado 4 ft. high. The columns, at the doors and elsewhere, are of marble. The ticket office is 35 ft. x 52 ft. At the right of this is the telephone room, above mentioned, and farther to the right is the women's retiring room, 20 ft. x 50 ft. The men's room is behind the ticket office, and is entered by the door at the left.

The restaurant is at the opposite end of the main waiting room; and on the south side (at the left, in the view) is a semi-circular vestibule which affords an entrance to the baggage room, to the parcel room and to the train platforms. One side of this semi-circular room is shown on page 400. In this vestibule there is a gallery at the second floor level connecting with the train platform on the south side and also affording an entrance to the offices which occupy the second floor of the building on the west, north and east sides. These offices occupy the whole area of the building, except the central portion, in which the main waiting room extends up to the roof.

Another illustration shows some of the details of the west end of the main waiting room. The baggage room, occupying the southwest angle between the converging lines of the tracks is 175 ft. long, and in its widest part 100 ft. wide.

The Boston & Albany has five tracks passing the station, but two of these are devoted to freight trains, leaving only three for passengers. Passengers from the station reach the westbound passenger platform by means of three stairways. To reach the third or eastbound track they pass through a subway beneath the first two tracks and ascend stairs to an island platform, which gives access to the eastbound, and also to the

local or middle track. A similar subway at the northwest side of the station leads to the stairways giving access to the island platforms adjacent to the viaduct tracks. All of these stairways to the train platform are easily reached from the street without going through the building.

The station is owned by the Boston & Albany, the other roads paying rent in proportion to their share of the business done. The cost of the structure was about $750,000, of which about $200,000 was required for the granite foundation, a costly substructure of piles having been necessary. The architect was Samuel Huckel, Jr., of the firm of Watson & Huckel, Philadelphia. The building was put up by the Woodbury & Leighton Company, under the supervision of F. B. Freeman, chief engineer of the Boston & Albany, and M. S. Jameson, resident engineer.

LETTERS FROM AN OLD RAILWAY OFFICIAL TO HIS SON, A GENERAL MANAGER.*

XIV.

Chicago, July 8, 1911.

My Dear Boy: You write me that your work is heavy, that your territory is extensive, that you wish to divide it into two districts each under a general superintendent. If your president follows his usual practice and asks my advice it will be summed up in four letters, "d-o-n-t." For years I have been seeking in vain for a general superintendent's district with an entirely satisfactory administration. I know many strong general superintendents. The trouble is not with them, but with the system. Organization is a series of units. These units get out of balance when they are defective or incomplete. There is usually withheld from the general superintendent some such vital process as car distribution, on the specious plea that such activity is so different it can be more cheaply handled by some higher office. If the organization unit is created it must have the same full chance for life and development as the rest of the offspring. A principle in organization cannot be violated with impunity any more than in other branches of science.

The average general superintendent's office is a great clearing house for correspondence. Few matters receive final action and many are passed along to the general manager's office. The resulting delay usually does more harm than good. On the other hand, since we all like to feel that we are highly useful, the general superintendent, or his chief clerk, is unconsciously dwarfing the initiative of superintendents by requiring references to him of matters that should receive final action at division headquarters. If you do not believe it, check up a few general superintendents' offices and study the processes. I am not referring to jurisdictions where a general superintendent is required by charter or other legal requirements. I have in mind districts which are arbitrarily created by ill-considered executive mandate.

The general superintendent starts out with a brave determination to get along with a small staff. Sooner, rather than later, human nature asserts itself; he feels that *my man* can be more useful if he is on *my staff*. He builds up a larger staff with an inevitable retarding bureau of correspondence. He perhaps has a $200 traveling engineer finding fault with the division performance of the $300 superintendent.

Sometimes a general superintendent is located at a large city under the theory that the importance of the metropolis demands an officer of higher rank. There are various ways to skin a cat, and the method we have seen is not necessarily the only solution. The Pennsylvania handles successfully large cities like Cincinnati, Cleveland and Chicago with a superintendent who has the authority of a general agent.

The unit system of organization, because based on sound fundamental principles, solves several vexatious problems. Among these is this matter of general superintendents' districts. Under the unit system every assistant should have his office of record in the same building with the head of the unit. For example, it is a violation of good organization to give a district passenger agent the title of assistant general passenger agent with an office of record at a city away from the general offices. If such outlying office of record is necessary, and it sometimes is, a complete unit should be segregated under a head with some such distinct title as district or division passenger agent. This does not, however, preclude having an assistant reside in the outlying city and maintain his office of record at the general office in the same file with the head of the unit.

If I were you I would appoint enough assistant general managers so that you can have one reside at each point where you have dreamed district headquarters are necessary. Give him a business car and a stenographer, but let him understand that his office file is a part of yours. Let him live on the road as a high class traveling inspector, superior in rank to the people he is inspecting. He is your staff officer with line authority available for action when in his judgment circumstances so require. He can obtain all necessary information from the files at division headquarters or by telegraphing your office. Your chief of staff, the senior assistant general manager, will promulgate instructions, while this traveling representative, like a trainmaster on a division, will see that they are carried out. When he finds it necessary to give instructions he should promptly notify your office, that the record may be completed and confusion avoided. He can do all this without becoming bureaucratic, without putting the company to the expense of a great circumlocution office maintained under the feudal notion of his royal importance Railway administration suffers from too many offices and instructions, not from too few. The best officials, and the best train despatchers, give the fewest orders. It is a qualitative rather than a quantitative proposition.

The moral effect of the presence of an official cannot be discounted. We need more officials and fewer clerks. The railways are over-manned, because they are under-officered. The great mistake of the past, due to crude conceptions of organization, has been in creating offices rather than officials.

The same line of reasoning applies to the handling of outlying terminals on a division away from a despatcher's office. The old idea has been to locate a trainmaster with an office at such points. The moral effect of his presence is unquestionably good. The objection is that he must necessarily be on the road much of the time, and the train crews are handled by a clerk. Duplication results because most of the correspondence and records have to be referred to the superintendent's office. The Union Pacific has found it better under the unit system to have an assistant superintendent reside at such important terminals. His office, however, is located with the superintendent, which encourages travel back and forth, just what is desired, and discourages sitting in an office and carrying on correspondence which can better be looked after by the chief of staff in the superintendent's office. The train crews are under the immediate direction of the yardmaster when in the terminal, and of the train despatcher when on the road.

The railways of this country have suffered from rigidity in administration. The unit system permits an elasticity of assignment to take care of conditions as they come along. For example, your non-resident assistant general manager can, if desirable, chaperon three divisions when movement is heavy, and four or five, if you please, during the dull season. You can on short notice throw all assistants to the most exposed points. A non-resident assistant superintendent can likewise be sent to an exposed district. A permanently located trainmaster requires an official circular to have his jurisdiction extended, and if suddenly ordered away can leave only a clerk to represent the company. A railway has an ever present firing line. The more mobile the official force the more promptly can weak portions be reinforced.

A striking violation of the unit principle in organization is

to have the master mechanic report to the division superintendent in transportation matters and to the superintendent of motive power in technical matters. This is a half way attempt at divisional organization which lacks the courage of conviction. Better have a straight departmental organization with its divided authority and expensive duplication than thus to straddle the question. If the division is to be a real unit it must be complete and self-contained. The lack of balance in this attempt at divisional organization comes from the fact that units are mixed. The superintendent of motive power, a general officer with jurisdiction over the entire road, is a member of the general manager's staff. He has a rank and value superior to that of a divisional officer, the superintendent. The poor master mechanic is often puzzled which superior to please. His natural inclination will be towards the man higher up, the superintendent of motive power. Again, it is difficult for any three men to agree upon what are technical matters. The chief of staff method is not applicable to this phase of the problem, because units have been mixed. The master mechanic and the superintendent of motive power are not components of the same integral unit. The unit system of organization requires a superintendent of motive power to transact all business of record with the office of the superintendent of the division, a component unit of the general jurisdiction. The senior assistant general manager and the senior assistant superintendent, each, as a chief of staff for the head of his unit, decides promptly in the absence of the head of the unit what matters are sufficiently technical to demand the attention of a particular official. Clear cut, definite and prompt action is possible, with proper check and balances, because units are not mixed. The governor can introduce a balance without throwing the administrative machine out of gear to avoid stripping its cogs. The splendid personal equation of railway officials often serves to carry an illogical organization in spite of its fundamental defects. Similar violations of scientific principles in material things would cause bridges to collapse and locomotives to break down. The showing made by the railways is a tribute to the administrative ability of their officials rather than to their knowledge of organization. The Pennsylvania a half century ago, and the Harriman lines in more recent years, are said to be the only roads that have made comprehensive studies of the science of organization. Both of these great railways are prepared to stand the test of time. Both will grow stronger as the years roll by. So feudal is the conception of organization on most railways that the essential elements of self perpetuation are sadly lacking. Fortunately their traffic strength is so great and our country develops so fast that errors due to preconceived misconceptions and personal caprice are covered up by increased earnings. One encouraging sign is that railway officials have ceased to be quite so cocksure of themselves and are seeking the underlying reason for the faith that is in them. True science ever finds its vindication in impartial inquiry and intelligent investigation. The world advances by definite steps rather than by leaps and bounds. Do not lament the fact that some roads are groping ahead only to occupy the abandoned organization camps of the Harriman lines. Be thankful rather that they have moved forward at all, that though lacking in faith they are coming to a position admitting of enlarged perspective.

Affectionately, your own, D. A. D.

Dr. Haarmann, of Osnabwig, known in Germany as an iron master of extraordinary ability, and to the rest of the world for his exhaustive work on track, in which is figured nearly every thing that was ever tried in the way of rails, joint fastenings, etc., with many that were only dreamed of, has retired from active business life. He collected a museum of all objects pertaining to railway track, which he presented to the Prussian government. It is now in Berlin, and should be studied by every man interested in the subject who goes there.

OHIO PUBLIC SERVICE LAW.

The act of the legislature of Ohio, changing the name of the railway commission to that of "The Public Service Commission," and granting large powers to that body, and which went into effect on June 30, is a document of 27 pages, and it has 90 sections.

The term "railroad" is used to include cars, by whomsoever operated, bridges, ferries, etc., storage elevators, express companies, water transportation companies and interurban railway companies; and the commission has powers of supervision over all alike. The law applies to transportation of passengers and property, storage, icing, sleeping-car operation, freight lines, etc.; and it is intended to regulate all services, practices and charges except such as are subject to federal regulation. The cost of maintaining the public service commission, not exceeding $75,000, is to be collected from the railways and public utilities in proportion to their intrastate gross receipts.

The term "railroad" includes interurban lines; but all other utilities are put in a class by themselves and numerous sections apply to these and not to railways. The term "public utility" is used to include all these other concerns—telegraph and telephone companies, electric light and gas companies, pipe lines, water works, street railways in cities or towns and suburban railways, but not to include steam or interurban railways. The law does not apply to public utilities not operated for profit, nor to those owned and operated by a municipality.

The public service commission is empowered to supervise and regulate. Where a property lies partly without the state, the power applies only within the state. The commission shall have power to inspect and examine; to call for books, records, contracts, etc., and require testimony. Any person refusing may be reported to the common pleas court, which must compel obedience.

Sec. 10. The commission is to keep informed as to the general condition of all public utilities. Every public utility must file copies of contracts with other public utilities. The commission shall establish a system of accounts for publicit utilities and prescribe the forms of record. If it shall determine that any expenditures or receipts have been improperly charged or credited it may order the necessary changes in such accounts.

Every public utility shall furnish reasonable and adequate service and make reasonable charges. Discrimination, by rebate or otherwise, is forbidden; nor shall free service or service for less than actual cost be furnished for the purpose of destroying competition.

Every public utility must file tariffs of all its charges by October 1, saying how long such charges have been in force.

Nothing in this act shall be taken to prohibit a public utility from entering into reasonable arrangements with customers or employees for the division of profits or for the making of charges according to quantity used, purpose for which used, etc., but all such arrangements must be filed with and approved by the commission.

No public utility shall make any charge except according to its published tariffs. Rates provided for by existing contracts executed prior to the passage of this law shall not be considered as discriminatory; but when any such contract terminates the commission may forbid its renewal. Unless ordered by the commission no change shall be made in rates in force June 30, 1911, except after 30 days notice to the commission.

A complaint in writing against a public utility must be made known to the utility and a hearing given, after notice of 15 days or more. If a public utility makes a complaint in any matter affecting its own product or service, the commission must publish notice thereof and then, after ten days, hold a hearing.

Whenever the commission shall be of the opinion, after hearing, that a rate is or will be unjust or preferential, or a service inadequate, or that rates are insufficient to yield reasonable compensation, it shall fix and determine reasonable rates; but in

considering reasonable compensation it must value a franchise only according to what has actually been paid for it (to the city or county).

The commission shall have the right to investigate and determine the value of all property of every public utility; but before final determination, must hold a public hearing. The commission may at any time, upon its own motion, make a revaluation. Whenever the rules, regulations, measurements or practices of a public utility are unjust or unreasonable, the commission shall determine the rules to be observed, the service to be installed, etc. Where repairs or improvements are found necessary the commission may order the proprietors to do what is necessary; and they shall obey such orders.

Every public utility occupying a highway shall, for a reasonable compensation, permit the use of its equipment, etc., by any other public utility whenever the commission shall determine this necessary. In case of failure of joint occupants to agree, the commission is to prescribe conditions and compensation. In emergencies the commission may temporarily alter rates and orders, with the consent of the public utility concerned.

The commission shall keep informed of all new construction, extensions, etc., to the property of public utilities and may prescribe the method of keeping construction accounts. The commission shall ascertain and prescribe suitable and convenient standard commercial units of the product or service of a public utility; also may ascertain and fix serviceable standards for the measurement of quality, pressure, voltage, etc.; and it may inspect meters. [This and the nine preceding paragraphs refer to sections apparently not applicable to railways. Some of these subjects as related to steam railways are dealt with in statutes already in force.]

Information in the possession of the commission shall be public except as the commission may withhold it for a reasonable time.

No person shall be excused from testifying on the ground that his testimony might tend to incriminate him, but such a witness shall not be prosecuted except for perjury.

When the commission orders a joint rate and the parties do not agree upon the apportionment the commission may, after hearing, fix the apportionment. All orders of the commission take effect in thirty days unless a different time is specified. When the tracks of a steam railway or an interurban or a suburban railway, or any of them, cross, connect or intersect, and if of the same gage, the roads may build connecting tracks; and if any road refuses, upon proper complaint, the commission shall investigate and may order a connection made, apportioning the cost thereof. The connection having been made, the railways shall afford all reasonable and proper facilities for interchange. Where a derailing device is required, the commission shall prescribe regulations and designate the company that shall be responsible for the operation thereof. Any person or railway aggrieved has thirty days in which to ask for a rehearing.

Any municipal corporation having a contract with a public utility may, within one year before its expiration, proceed to renew the contract or fix rates, etc., as now provided by law; but upon complaint of 1 per cent. of the voters, presented within two months, the commission shall, after due notice, give a hearing. Rates agreed upon between a city and the utility, if complained of by 3 per cent. of the voters, must be investigated. The commission may require a public utility to make a deposit pending possible reduction of charges, such moneys to be used to repay persons who have been overcharged if rates shall finally be reduced. Where the commission reduces the rates of a public utility, it must ascertain and determine the valuation of property on which its decision is based.

The present act does not apply to rates fixed by cities for use of streets, etc., except in accordance with the procedure just outlined.

Every public utility must make an annual report, as prescribed by the commission. Every public utility must carry a proper and adequate depreciation or deferred maintenance account, if required by the commission after investigation. The commission is to prescribe depreciation rates, which must be sufficient to keep the property in a state of efficiency corresponding to the progress of the art or industry. The moneys for depreciation charges must be set aside and carried as a depreciation fund. This fund may be used to renew, restore, substitute, etc., but for no other purpose except upon the approval of the commission. If invested the interest must be added to the fund. The council of a city or town may require public utilities to make additions or extensions to their distributing plants.

No telephone company shall exercise a franchise where there is already a telephone company furnishing adequate service, unless the commission gives authority.

A public utility or a railway may issue stocks, bonds, notes, etc., payable in one year or longer, when authorized by the commission, and not otherwise. This section sets forth in detail the purpose for which securities may be issued and elaborate provision is made for giving hearings preliminary to granting authority to issue stocks, bonds, etc. No interstate railway or public utility shall be required to apply to the commission for leave to issue stocks, bonds, etc., on property outside of the state.

Properties now in the hands of receivers are exempt from the law as regards old securities, but the law applies to new or reorganized companies. Any director or officer making false statements to secure the issue of securities is liable to $500 fine or ten years in prison. Stock dividends, etc., are forbidden, except by authority of the commission. The commission may not authorize the capitalization of a franchise in excess of the amount actually paid to the town or city. The stock of a consolidated corporation must not exceed the sum of the stocks of the corporations consolidated. Bonds cannot be issued as a lien on any contract of consolidation, nor shall the debt of the consolidated company exceed the debts of the companies consolidated.

With the consent of the commission any two public utilities furnishing like service or product may contract with each other for joint operation; or they may consolidate, or one may buy the other. The procedure to secure this consent is set forth. With the consent of the commission any two or more telephone companies may consolidate, the commission first having ascertained the values of the properties. The commission may require any two or more telephone companies connecting with each other to operate a through line, and may prescribe joint charges.

Section 67 makes every public utility or railway liable to $1,000 fine for violation of the law, each day's continuance to be a separate offense.

Section 68 makes officers and agents liable to a fine of $100 to $1,000, or two years imprisonment, or both, for violation. The attorney-general must prosecute, in the name of the state, when directed so to do by the commission. Whenever the commission shall be of the opinion that any public utility or railway has failed, or is about to fail to obey the law, the attorney-general, on request of the commission, shall prosecute the offender or prospective offender. Any public utility or railway shall also be liable for treble the amount of damages caused by its violation of the law. Any public utility, or railway, or any person in interest, when dissatisfied with an order, may within sixty days proceed in the court against the commission. A complaint thus brought into the court shall not operate to suspend the order of the commission unless the court, after hearing, shall authorize such suspension; but the commencement of a suit shall suspend the order of the commission if the public utility or railway shall choose to continue the old rates and agree, with suitable bond, to refund the difference to customers in case a final determination shall order a reduction in rates.

When the commission serves an order it is the duty of every person or corporation to send a written acknowledgment of the receipt of such order, and also to comply with any requirement of the commission that within a time specified answer shall be made whether the terms of the order will be obeyed.

Section 75. This law does not prevent giving free or reduced rate service for the government, the state, cities, towns, etc., or for charitable purposes or for fairs, or to employees.

No franchises for an electric light company, gas company, water-works company or heating and cooling company shall be transferred to any corporation not duly incorporated under the laws of Ohio.

Companies formed to do business under this law are subject to the law, though they may have acquired no property and may not have begun business.

Section 81. The commission shall furnish information to other officers or commissions of the state and such other bodies shall similarly aid the public service commission in the performance of its duties.

Section 82. Where an investigation shows that a rate is unjust or that service is inadequate, etc., the public utility found to be at fault shall pay the expenses incurred by the commission.

Section 83. A member of the commission wilfully overvaluing property with a view to justifying higher rates, or undervaluing to prevent the exaction of a lawful rate, is liable to a fine of $1,000 or two years imprisonment, or both. The commission is to make an annual report December 15, printing 2,500 copies of it. It may appoint a secretary and suitable assistants and fix their compensation, but all appointments, salaries and compensations shall first be approved by the governor. Each commissioner shall receive an annual salary of $6,000.

RETRENCHMENT IN THE RAILWAY LABOR FORCE IN 1911.*

This study is the result of an attempt to ascertain what retrenchment in the number of men employed by the railways has been made in 1911 as compared with 1910. As the annual reports of the railways to the Interstate Commerce Commission for the fiscal year 1911 will not be ready for some weeks to come, a number of typical railways were requested, under date of May 8, 1911, to prepare a statement of the number of employees on their pay rolls on April 30, 1910, and on April 30, 1911.

The returns thus far received cover nearly 60 per cent. of the total operated mileage of the country and are as follows:

	Total operated mileage.	Total employees.	Employees per 100 miles of line.
April 30, 1911	139,755	987,790	707
April 30, 1910*	137,671	1,069,570	777
Increase	2,084	.....	...
Decrease	.... ..	81,780	70

*For about 4,500 miles of line, on which it was stated that no retrenchment had taken place, the number of employees was reported as of June 30, 1910, instead of April 30. However, this should not affect the conclusions, as it is not probable that many changes in labor force occurred in the two months succeeding April 30.

It will be perceived that while the operated mileage of the railways covered by the study had increased during the year between April 30, 1910 and April 30, 1911, by 2,000 miles, or 1.5 per cent., the men employed in operating the increased mileage had decreased by nearly 82,000, or 7.6 per cent. That is, the number of employees for every 100 miles fell during the year from 777 to 707, or 9.0 per cent. For each 100 miles of line, the total number of employees was less by 70 men in 1911 than in 1910. If conclusions may be drawn for the whole country from the reports of nearly 60 per cent. of the mileage, it would appear that during the year under consideration the labor force of the railways was cut by nearly one-tenth, as a result of effort to reduce expenses and effect economies at every point.

Railways representing 19,706 miles of line reported the following changes for the various operating expense accounts:

Account.	Employees per 100 miles of line. 1910.	1911.	Decrease.
Maintenance of way	301	231	70
Maintenance of equipment	155	151	4
Traffic	6	6	0
Transportation	262	233	29
General†	32	32	0

†Includes miscellaneous.

*From Bulletin No. 17 of the Bureau of Railway Economics, Washington, D. C.

It will be seen that the equipment, traffic, and general accounts remained practically stationary, but that considerable decreases occurred in maintenance of way and in conducting transportation. The number of maintenance of way employees decreased 23.3 per cent., and of transportation employees 11.1 per cent. Reductions in maintenance of way force frequently but not necessarily indicate retrenchment. One road reporting retrenchment stated, for example, that its reduction in maintenance of way labor force was due directly to unfavorable weather conditions. But a decrease in employees engaged in transportation can be due to but one of two things, or to both—decreased business or enforced economy.

Only a portion of the railways replying to the inquiries classified the changes in their labor force by occupation. These roads, which operate a total of 8,762 miles, reported changes as follows:

Occupation group.	Employees per 1,000 miles of line. 1910.	1911.	Decrease.
General officers	19	19	..
Other officers	48	49	1*
General office clerks	241	245	4*
Station agents	154	150	4*
Other station men	455	456	1*
Enginemen	253	248	5
Firemen	263	254	9
Conductors	166	167	1*
Other trainmen	520	496	24
Machinists	255	245	10
Carpenters	216	203	13
Other shopmen	816	779	37
Section foremen	168	169	1*
Other trackmen	1,390	1,226	164
Switch tenders, crossing tenders and watchmen	143	145	2*
Telegraph operators and dispatchers	132	130	2
Floating equipment	3.6	2.3	1.3
All other employees	832	779	53
Total	6,077	5,762	315

*Increase.

This table shows that a majority of the occupation groups remained practically stationary, either changing not at all, or increasing or decreasing to a very slight extent. The largest reductions in force are found among the trackmen, the miscellaneous employees, and the shopmen. By combining the groups the changes will be brought out in bolder relief:

Main group.	Employees per 1,000 miles of line. 1910.	1911.	Decrease.
Officers and general clerks	309	313	4*
Station men	610	606	4
Trainmen	1,202	1,165	37
Shopmen	1,287	1,227	60
Trackmen	1,559	1,395	164
Switch tenders, etc	143	145	2*
Telegraph operators and dispatchers	132	130	2
All other employees (including floating equipment)	836	781	55

*Increase.

Trackmen per 1,000 miles were reduced 164, or 10.6 per cent.; miscellaneous employees 55, or 6.6 per cent.; shopmen 60, or 4.7 per cent.; and trainmen 37, or 3.1 per cent. Maintenance of way, represented by trackmen, is here shown to have suffered the greatest reduction in the number of employees, followed by maintenance of equipment, which is represented by shopmen; while conducting transportation, represented by trainmen, also underwent a decrease. Much the same relationship exists among the reductions in the operating accounts of roads that made only partial returns by occupations. The reductions reported by these roads, which have not been included with the reductions shown in the detailed tabulations just presented, center largely on the engineering department, maintenance of way, enginemen and firemen, and maintenance of equipment.

If the data which is presented above is representative, and the bureau has reason to think that it is, the conclusion seems clear that a considerable retrenchment in number of employees has been effected during the past year on the railways of the United States—not only retrenchment per mile of line, but also a retrenchment in the whole number of employees regardless of increased mileage. Not until the complete returns for 1911

are at hand will it be possible to make any general or definite statement regarding this retrenchment; but the figures cited above show the reductions to be largely in maintenance of way, transportation, and maintenance of equipment forces. That is, the retrenchment in process by the railways at the present time has not only touched the forces which are always the first to suffer when retrenchment is necessary, but is also beginning to cut into the transportation forces, which are maintained at a full quota until rigid economy is demanded.

RAILWAY WAGE INCREASES FOR THE YEAR ENDING JUNE 30, 1911.

In response to a circular letter sent by the Bureau of Railway Economics to a number of railways, asking for an estimate of the increase in their wage bill for the fiscal year 1911 as compared with 1910, replies were received from systems representing an operated railway mileage of 47,500 miles. These systems were the following: the Atchison, Topeka & Santa Fe, the Baltimore & Ohio, the Chicago & North Western, the Illinois Central, the Missouri, Kansas & Texas, the Norfolk & Western, the Northern Pacific, the Pennsylvania, the Southern Railway and the Union Pacific.

The data thus furnished has been tabulated and the results are presented herewith. It will be understood that this study is merely preliminary, and its findings are to be taken only as indicating in a general way the trend of railway wages in 1911. Later returns for the fiscal year 1911 when completed, will present the facts more fully and definitely.

In preparing their estimates, the railways included only such increases in total compensation to employees as were due to increased rates of pay, and excluded those due to enlargements in labor force. This was made easy by the fact that, as records on file in the bureau seem to indicate, on five miles in every six of the operated railway mileage of the United States a smaller force is employed in 1911 than in 1910. While the 1911 figures were sent to the bureau before the close of the year, and are partially estimated, yet they are considered as approximately correct.

A number of increases which were effective throughout the whole of the fiscal year 1911 took effect for the first time during the year 1910. As a result, the increase of 1911 over 1910 does not appear so striking as would the increase of 1911 over 1909 or 1908. Furthermore, a number of the increases which were in effect June 30, 1911, took effect during the fiscal year 1911, and will not make their full force felt until the fiscal year 1912. Hence the increase of 1911 over 1910 does not appear so marked as will that of 1912 over 1910. Therefore the showing in the following tabulations of wage increases for 1911 can be regarded as well within the facts.

The wages paid in 1910 by the ten systems named above, on the 47,500 miles operated by them, amounted to $300,527,000. The estimated wage bill of the same systems for 1911, computed for the same force of employees as in 1910, is $315,163,000. The difference, $14,636,000, represents an increase of 4.87 per cent.

A number of the responding railways arranged the wage increases on their lines according to groups or classes, and these classifications have been tabulated below. The first table shows the increases distributed according to operating expense accounts, so far as the increases are reported in this manner. There are given in this table the mileage for which the particular facts were reported, the total compensation in 1910 and 1911 corresponding to that mileage, and the amount and per cent. of increase.

The second table shows the increases in the different classes of employees, so far as they are reported in this manner. Here again there are given the mileage, the total compensation in 1910 and 1911 corresponding to the given class and mileage, and the amount and per cent. of increase.

Table I.—Amount and Per Cent. of Increase in Compensation, 1911 Over 1910, Distributed by Operating Expense Accounts.

Account.	Miles represented.	Compensation, 1910.	Compensation, 1911.	Increase. Amount.	Increase. Per Cent.
Maintenance of way and structures	14,015	$19,364,940	$20,123,924	$758,984	3.92
Maintenance of equipment	12,064	11,837,707	12,541,368	703,661	5.94
Traffic expenses	7,629	507,921	523,041	15,120	2.98
Transportation expenses	7,629	19,702,368	20,541,093	838,725	4.26
General expenses	9,581	1,394,524	1,447,918	53,394	3.83

Note.—As stated in the text, only such increases in total compensation are included in this table as are due to increased rates of pay, those due to enlargements in labor force being excluded.

Table II.—Amount and Per Cent. of Increase in Compensation, 1911 Over 1910, Distributed by Occupation Classes.

Class.	Miles represented.	Compensation, 1910.	Compensation, 1911.	Increase. Amount.	Increase. Per Cent.
Enginemen	42,089	$21,448,106	$22,671,109	$1,223,003	5.7
Firemen	35,606	11,584,471	12,330,564	746,093	6.4
Conductors	42,089	13,274,634	14,253,712	979,078	7.4
Other trainmen	42,089	25,969,544	27,693,075	1,723,531	6.6
Station agents	19,741	2,275,320	2,358,061	82,741	3.6
Other stationmen	10,739	4,335,794	4,462,011	126,217	2.9
Machinists	23,152	4,442,630	4,710,129	267,499	6.0
Carpenters	9,913	3,354,726	3,534,030	179,304	5.3
Other shopmen	23,152	12,503,799	13,191,048	687,249	5.5
Section foremen	19,741	2,358,239	2,440,082	81,843	3.5
Other trackmen	27,201	15,871,299	16,186,443	315,144	2.0
Telegraph operators and despatchers	29,605	8,051,637	8,444,387	392,750	4.9

Note.—As stated in the text, only such increases in total compensation are included in this table as are due to increased rates of pay, those due to enlargements in labor force being excluded.

Grouping together the first four classes in the foregoing table as "trainmen," the next two as "station men," the next three as "shopmen," and the next two as "trackmen," we find the percentage of increase in wages between 1910 and 1911 to be as follows:

Group.	Per Cent. of Increase.
Trainmen	6.46
Station men	3.16
Shopmen	5.58
Trackmen	2.18
Telegraph operators and despatchers	4.88

As was to be expected, there was a considerable increase in the wages of shopmen, corresponding to the large increase shown under the maintenance of equipment account. Trainmen received increases amounting to over 6 per cent. Switch tenders, crossing tenders, and watchmen show wage increases, but the classification of employees as switch tenders and watchmen varies so much from road to road, and even on the same road from year to year, that the figures were too unreliable to be tabulated. Increases for the other classes, however, may be regarded as reliable indications of the tendency of railway wages at the present time.

FOREIGN RAILWAY NOTES.

The fastest German train now runs in Bavaria, between Munich and Nuremberg, making the distance of 123½ miles in 135 minutes, or at the rate of 54.9 miles per hour. It makes no stop on the way. Nuremberg is 690 ft. lower than Munich, and the train is 31 minutes longer going in the opposite direction.

The Swedish state railways have had a third-class sleeping car for seven months on a train between Stockholm and Gothenburg. There are three tiers of berths in a section, in each of which two persons can lie, the charge being 67 cents per person. The car was not very well patronized by sleepers, but the unoccupied sections could be used for other passengers. The accommodations were generally satisfactory, so far as the sleeping places are concerned; but there were complaints of a stifling atmosphere, which the railway men say was because passengers refused to open the ventilators for fear of drafts. A more general complaint was that the early risers found such an accumulation of baggage in the passage that it was almost impossible to move in it, which one who has traveled in Europe can readily believe. The management will probably ask for one or two more such cars and try them on a more frequented line.

SUPPLY CARS AND INSPECTION.*

BY W. H. WHALEN,

Superintendent, Southern Pacific, Los Angeles, Cal.

To the extent that a superintendent of a division can personally inspect premises and advise on the ground with the various employees depends his success in safely and economically conducting transportation and maintenance of way matters. Employees are willing to co-operate and carry out instructions if the superintendent's desires are placed fairly before them, as we are in an age when employees are ready to follow instructions and endeavor to give satisfactory service if only told what is wanted.

To make this inspection has been one of the hard propositions to solve in matters of this kind, and in fact has never been solved until the practice of running a monthly general inspection and supply train was introduced on the Southern district by H. V. Platt, general superintendent, about two and a half years ago. The train consists of cars loaded with the various supplies needed and cars equipped to carry the surplus material and scrap that is to be picked up. On the Los Angeles division this train is run monthly, leaving Yuma at 5:30 a. m. on the fourteenth of each month, the first day running to Calexico via Imperial Junction, and back to Imperial Junction, laying over there that night, from which point it starts the following morning at 5:30 for Colton, where it lays over for the night, leaving there the next morning at 6 o'clock for Los Angeles, taking in the side lines that day.

From this train the pay checks are delivered, and with this system we pay the employees within a few minutes of the same hour on the same date each month in the year. A complete inspection is conducted at the same time by the superintendent, and such of his divisional officers as he desires to accompany him, being always accompanied by the division engineer and the division storekeeper, making inspection of all premises, the interior of all buildings, and such equipment as is used by employees. He is able to determine the physical condition of all equipment, and to determine whether with it an employee is able to do his best work. All worn out or run down equipment is gathered up by this train and brought to the shops for repairs or to go to the scrap pile, where credit is given the division for it. Surplus material is gathered up and used to fill requisitions filled out of regular store supplies. He is able to see that the necessary supplies are on hand to enable section forces to protect trains properly in case of storm or accident; he is able to see that the right amount of material is given, and only in this way is he able properly to consider requisitions that have been made for supplies by the various departments. He is able to see each employee and talk to him about his work. An interpreter is taken along four times each year to give the foreign laborers a chance to explain anything that should rightfully come to the superintendent's notice; without such an interpreter, probably irregularities might creep in. At the same time they are given to understand that no train is too good to stop to take a doctor to them or bring one of them to the hospital. From the personal conference with the various employees and through the agency of this interpreter, the superintendent is able to build up a spirit of confidence and co-operation. A time inspector is taken along, and a record is made of each employee's watch. The agent at Los Angeles accompanies this train periodically that he may talk with the agents at the small stations and hear from them how satisfactory the loading of L C L shipments has been. This gives a chance to correct any irregularities that exist or that might result in unsatisfactory service to patrons of the road if allowed to go uncorrected. The scale inspector also accompanies the train periodically and balances up and looks after scales in general. About four times a year the roadmasters accompany this train over the entire division, each criticising and making notes of irregularities they find on each other's district. Such criticisms are considered at a meeting which is held in the superintendent's office immediately after the completion of the inspection trip, each roadmaster returning to his district and correcting any irregularities that have been found. On these trips the superintendent also has an opportunity of looking after the schooling of the children of families employed on the desert, and efforts are put forth to have every child who desires to attend school afforded an opportunity to do so.

*A fuller description of the equipment of the supply cars and their relation to stores is given in H. C. Pearce's book on The Supply Department.

ECONOMY IN THE TELEGRAPH DEPARTMENT.*

BY WILLIAM BENNETT,

Superintendent Telegraph, Chicago & North Western.

Savings may be effected in the telegraph department as in other departments. One way is by cutting down the volume of business, which method is being adopted to some extent. The use of the telegraph service has often been abused. There is a question, however, about this method of saving, as there is no way of determining where to draw the line. The elimination may be carried to such a point that the saving would more than be offset by losses sustained. Another method is to close some of the offices. Here also there is always a question as to the wisdom of the course. Another way would be to reduce maintenance expenses either by increasing the line covered by a maintainer, reducing supplies, or employing less expensive material and labor. These methods, on the face of them, do not appeal to many of us as entirely practical.

True economy is that economy which utilizes to the fullest extent the facilities at hand and produces the best results at the least expense.

Increasing the efficiency of telegraph lines, by duplexing, quadruplexing, employing machine telegraph apparatus and the typewriter machine is well known; but, you all know, the greatest innovation in the telegraph departments in recent years is the use of the telephone.

The first cost of an up-to-date telephone train despatching line, complete, is considerable, but you will all agree that the expense is justified and that the improved service resulting more than pays a good rate of interest on the investment, not considering the saving in operating expenses made possible by closing telegraph offices which are but little used, and installing telephones at sidings and thus making it possible for the despatcher to receive information from, and issue orders direct to the trainmen.

When we get our despatching circuit working on busy divisions, there is usually a demand for a telephone message circuit. Some of the companies which seem not to have felt the restraining hand of economy too heavily have in some cases put up both circuits at the same time, which, of course, is the economical thing to do in constructing.

It is not anticipated that it will be much, if any, more economical to use telephone operators at stations than telegraph operators, but they are much easier to obtain and train into efficiency, and they can be well trained in much less time.

When a road has the despatcher's line and the message line in service, it is obvious that the wires may be used not only for these two very efficient services, but for other purposes. A large part of all despatching and message circuits now in operation have been simplexed for through telegraph work and a simplexed line can be duplexed and in some cases has been successfully quadruplexed. There is some question of the advisability of quadruplexing these simplexed lines, however, as they can be made to render more satisfactory service by compositing them and using the composite for through telephone service between division points.

In some cases plans are being made to extend this class of service in a little different way; instead of simplexing both despatchers' and message circuits, it is planned to phantom the

*A paper read before the Railway Telegraph Superintendents' Association at Boston.

two circuits and simplex the phantom and then duplex the simplex. One place where the construction of such a line is now under way is on the Louisville & Nashville. This circuit will ultimately extend from Louisville to New Orleans with intermediate stations at Nashville, Birmingham, Flomaton, Mobile and possibly Bowling Green.

A case of wire economy which may be of interest to you, as it was to me, is on the Evansville & Terre Haute, where, with two No. 9 B. & S. copper wires and two No. 8 B. W. G. iron wires, the following service is obtained:

An ordinary telephone train despatching circuit with 29 regular stations.

A metallic block signal telephone circuit with 27 stations.

A through simplex telegraph circuit over the despatcher's lines.

A local simplex telegraph message circuit with 29 stations over the block telephone circuit.

It was found in actual practice that it would not be practicable to connect the 36 siding telephones on this division to the despatcher's line. The business done from these 'phones was of such a character and so great in volume that it would not be possible to issue all train orders if so much other business pertaining to occupied blocks, clear tracks, coal car orders and various other things were handled on the train wire. It was decided to connect these telephones to the block telephone circuits and have the trainmen get their information from the block office. But at this juncture another difficulty presented itself; if the sidings were not connected to the train wire, no train orders from the despatcher's office could be given direct to trainmen at these points. To remove these objections, the block circuits were so arranged that the block line (with whatever siding 'phones might be connected to it) could be connected through a repeating coil to the despatcher's line. Thus, while the despatcher's line was relieved of the business of the siding sets, it was still possible, when desired, to connect them to the despatcher's wire to receive important orders.

There are other features of interest on this division, which show the extreme flexibility of the telephone system. In some cases it was desired to connect the local message circuit at stations not equipped for block 'phone. A repeating coil was used in these instances. In one case it was desired to work a block normal northward out of a station, but there was a siding on this north block section which had considerable business with the chief despatcher, whose office was south of the block office; and the business was such that the track despatcher was not directly interested. The connection in this case was made the same as connecting the block to the despatcher's wire, except that a separate pair of wires was used, thus relieving the train wire of the extra load.

It might be worthy of note also to mention the fact that the through simplex telegraph circuit over the train wire is connected to a line running north to Danville and there, through a repeater, to the quad wire working into Chicago; also the local message telegraph circuit over the block wires works through to Danville over a local message wire.

Automatic drops are wired in the despatcher's circuit at each station so that if the bell rings at a station when the operator is out, he can readily determine the fact by glancing at his signal box when he returns. One telephone in such a station performs all functions for both block and despatcher's lines. Switching panels are provided on these lines so that if at any time trouble occurs on the despatcher's circuit, the despatcher's wire between any two stations may be cut into the block circuit and the block wires cut into the train circuit. Other switches are provided for grounding the block telephone circuit in one direction and the local message telephone circuit in the opposite direction, so that it is very seldom that the block circuit is out of commission; when it is, the trains can be blocked temporarily over the train wire. The message circuit is always in commission up to the break in either direction, if there is a battery on the wire at both ends. The design of this ingenious arrangement, we believe is to be accredited to U. J. Fry (C. M. & H. P.), who has some of these circuits in operation.

The only possible further service obtainable from these circuits would be a through grounded composite telephone from end to end of the despatcher's line; but this might not be feasible, owing to disturbances from surrounding wires. Now, some of us may be skeptical of the possibility of an ordinary lineman keeping a circuit of this kind in operation, but the reports are that the circuits are giving good satisfaction and the man who is maintaining them is the same lineman who has worked on the telegraph lines of that division for some time.

Just what the saving is with the telephone over the telegraph is hard to calculate in this instance, as in most instances, as improved service is always considered more or less of a luxury, until for some reason, it is temporarily cut off, when every one interested begins to see that it is an every day necessity. No despatcher, who has used the telephone extensively will be likely to be contented to handle trains by telegraph for any great length of time.

Now, in view of the extensive possibilities, and of the increasing demands of traffic, true economy would appear to be for the telegraph departments to render all the service possible to both the passenger and freight traffic. Some of these means are utilizing the phantom telephone circuits or the message telephones for reservations, transfers, messages to secure traffic, tracing lost shipments, and a hundred other things. The truest economy is to increase the service by increasing the utilization of present facilities.

RAILWAYS OF THE MALAY STATES.

The railways in the United Malay States had at the end of 1908 a total length of 468 miles. The network consisted of the main line, beginning in the north in Prai, opposite the harbor of Penang, and cutting the province of Wellesley, the states of Perak, Selangor, Negri Sembilan and the Malacca settlement, southwards as far as the sultanate of Johore, with a total length of 252 miles; further, of a number of branch lines from this road, with a total length of 11 miles. Of this, the state of Perak has the section Taiping-Port Weld with 7 miles; Ipok-Trouoh 15; Topak Road-Telok-Anson 17; then the State of Selangor with the sections Batu Junction-Batu-Gaves 5 miles; Kuala-Lampur-Port Swettenham with 27; the State of Negri Sembilan, the section Seremban-Port Dickson, 24 miles; and Malacca, the section Tampin-Malacca, 21 miles. In the year mentioned in the report there were put in operation 40 miles of new road: the Seremban-Port Dickson to Ipoh-Tronok, as well as the prolongation of the main line from its former southern terminus Gemas to the boundary of the states of Negri Sembilan and the sultanate of Johore. The last-named section has for its object making a connection between the main line of the Malay United States and the Johore Railway, the northern part of which has been put in operation from the boundary to Segamet, 16 miles. Further, the railway net touches, on the northern terminus of the main line, Prai, the ports of Telok-Anson, Port Swettenham, Port Dickson and Malacca, on the west coast of the peninsula. The total capital invested in the roads already in operation was $45,501,086; being $3,285,992 more than in the previous year. This makes $97,136 per mile. Reckoning also the capital invested in motor cars for bringing passengers to the roads, the capital invested amounts to $45,923,430. Of this amount, the government has since the opening of the road in 1885 to the end of 1908 received back $18,173,633, or 39.94 per cent. of the investment. The general business depression had an unfavorable effect on the railways mentioned. Although on the average there were during 3¾ months of the year 40 miles more road in operation, the gross receipts were $225,202 less than in the previous year, being only $5,137,771. The clear profit for the year was $1,588,390, being 3.49 per cent. on the capital of $45,501,086.

Shop Section.

REMEMBER the annual convention of the Master Car and Locomotive Painters' Association, which meets at Atlantic City, N. J., September 12-15. The secretary, A. P. Dane, may be addressed care of the Boston & Maine, Reading, Mass. Among the subjects to be discussed are the best method of finishing the interior of steel passenger cars; concrete or cement floors of passenger cars from a sanitary standpoint; chemical and practical tests of railway paint shop materials; the painting of locomotives; paint mixing vehicles; removing varnish from car interiors; passenger car headlinings; preparation of painted parts of locomotives for repainting; relation of other departments to the efficiency of the passenger car paint shop; baking enamels; and linseed oil and its substitutes.

SEVERAL articles appear in this issue on the reclaiming of scrap material. Undoubtedly many of our readers may be able to suggest improvements on the methods which are described or outlined. In order to make these articles of the greatest possible value to our readers, we want every one of those who in reading them can see a way in which the methods can be improved on to immediately write us a letter telling just how they would improve them, or telling why the methods suggested are not the best. Such of these letters as are accepted for publication will then be published in the next issue, while the question is still fresh in the minds of our readers. Possibly you are using methods which are not mentioned at all, but which are giving you good results. Tell us about them. Letters accepted for publication will be paid for at our regular rates, the minimum payment for any article accepted being $3.

ABOUT a year ago we presented a large number of kinks from the Chicago & North Western shops at Chicago. The collection was prepared by those in charge of the shop, and was up to that time the most pretentious collection which had been prepared in this manner. This month we publish a similar collection of kinks from the Texas & New Orleans shops at Houston, Texas. Mr. Galvin, who is responsible for this collection, deliberately started out to locate and describe every good kink in the shops at that point, and this collection, which represents a portion of the kinks in the machine and boiler shops, is the result of his labors thus far. The collection speaks for itself, and we hope that he will obtain equally good results from his further investigations.

FIVE contributions were received in the competition on Reclaiming Scrap Material, which closed July 15. The articles were all very good and the judges were put to some difficulty in awarding the prizes. A. A. Burkhard, assistant general foreman in the car department of the New York Central & Hudson River at West Albany, N. Y., has been awarded the first prize of $35; and J. S. Sheafe, engineer of tests of the Illinois Central at Chicago, Ill., has been awarded the second prize of $20. The other contributors, all of whom presented splendid papers, were C. C. Leech, foreman of the Pennsylvania Railroad, Buffalo, N. Y.; W. H. Snyder, assistant general foreman of the New York, Susquehanna & Western, Stroudsburg, Pa.; and W. H. Wolfgang, draftsman of the Wheeling & Lake Erie, Toledo, Ohio.

LAST month we announced a competition to close October 15, on the benefits derived from attendance at the various conventions. During the past four months the *Railway Age Gazette* has published reports of the annual conventions of a considerable number of railway mechanical organizations. It has been suggested that there are too many of these associations. We do not believe that this is so, if these associations are doing the work for which they were intended. The question is: Are they properly conducted, and are they giving the best results possible? If they are, then they should receive the hearty support from the higher executive officers. To demonstrate that they are giving results—and we believe that they are—we have invited our Shop Section readers to tell us of the practical benefits which they have derived from membership in, or attendance at the conventions of the organizations in which they are specially interested. This is your opportunity. Are you going to take advantage of it? We have done our best to help your organizations—can you justify the interest that we have taken in them? A first prize of $35, and a second prize of $25 will be awarded for the best two letters or articles on this subject received before October 15. Articles not awarded prizes, but used for publication, will be paid for at our regular rates.

IN announcing our shop kink competitions, we have not at any time insisted that the kinks must be originated by the man who sends in the description, although we have suggested a number of times that as far as possible proper credit should be given to the inventor or designer of the various devices. We realize and understand that in a great number of cases the kinks may have been in use for such a long time that it is difficult to trace their history and to give proper credit for their design. In many instances those who have sent in collections of kinks have been very careful to give proper credit where it has been possible to do so. The man who takes the trouble of preparing the article is entitled to the credit for doing so, but it certainly will not detract from his reputation to acknowledge indebtedness to others for their assistance, or to give the names of those who designed or assisted in the design of the shop kinks. This statement is made because we do not want to have our position in the matter misunderstood, and because we want to have the assistance of our readers in pursuing a perfectly fair and square policy in the matter.

MR. BURKHARD'S article explaining the methods by which second-hand and scrap material is reclaimed and made use of at the West Albany car shops of the New York Central & Hudson River, is of more than ordinary interest, because of data showing in detail exactly what savings were made during the first six months of this year in reclaiming and reusing second-hand material at that point. It is true, of course, that West Albany is one of the largest and most important car repair points on the New York Central lines; but on the other hand, it must also be admitted that the smaller repair points are in a position to make equally important comparative savings. Mr. Burkhard's article describes the arrangement and equipment of the scrap platforms and briefly tells of the ways in which the old material is utilized.

RECLAIMING scrap material, in order to be productive of the very best results, should be reduced to a strictly commercial proposition, as is suggested by Mr. Leech's comment on the necessity of having a simple method of accounting in the handling of this work. If this is not done, it is quite probable that either those in charge will not fully realize the importance and necessity of pushing the work and in seeing that the rules and regulations laid out for it are fully lived up to, or in some cases they may go to the other extreme and spend so much money in reclaiming certain parts that there is not only no net gain, but a real loss. Mr. Leech also emphasizes the necessity of the economical handling of such material. In most cases the labor item forms almost the entire cost of reclaiming scrap and every precaution should be taken to reduce this cost to a minimum by carefully planning the work and arranging the

equipment and facilities to reduce the cost of handling to a minimum. Most of Mr. Leech's article, like that of three of the other contributors, is devoted to the car department, although a most important section considers the way in which the borings and turnings from different classes of material in the machine shop may be kept separate, and thus be disposed of to the best advantage. True, this is not such a serious problem in a large shop where certain machines can be assigned to handle certain classes of work exclusively, but it is a most difficult problem in the smaller shops where each machine may have to handle several different materials during the day. Mr. Leech's suggested solution of this problem for such shops is a good one.

MR. SHEAFE'S article on reclaiming scrap material is brief, but very much to the point. Over $1,600 a month is saved at the Burnside shops of the Illinois Central in repairing and reinforcing damaged I-section brake-beams, in re-rolling rods in a simple and small 2-high rolling mill and in reclaiming the paint skins and slops which are gathered up over the system. This is a saving which is well worth striving for and the department which is devoted to this work is most interesting and well worth visiting.

UNLIKE most of the other contributors in the competition on reclaiming scrap material, Mr. Snyder touches upon the locomotive department. He makes three good suggestions—the using of the old copper steam chest joints which have become flattened and which on many roads are discarded, the utilization of old jacket iron and the remixing and using of scrap boiler lagging. He also refers to the repairing of damaged parts of steel cars. It is remarkable how small a proportion of the damaged parts of steel freight cars actually get into the scrap heap. Those in charge of the maintenance of these cars, at least on the roads where there are large numbers of them, should be congratulated on the way in which they have reduced the amount of new material which is used for repairs to this class of equipment. We should have liked to have had more data of this kind presented in the competition. However, it is always acceptable and we shall be delighted to receive short articles along these lines from any of our readers. Mr. Snyder tells of a committee at his shop whose duty it is to visit the scrap platform each week and see that no useful material is wasted. This appears to be a splendid idea. Like any other thing which is really worth while doing, the reclaiming of scrap material can only be made a success by eternal vigilance.

MR. WOLFGANG'S article on reclaiming scrap material makes a number of splendid suggestions as to how various parts of car equipment can be reclaimed and used again. The arrangement of the article is especially good. His paper is the only one which makes any reference to the reclaiming of scrap by the use of the oxy-acetylene welding apparatus. A number of these outfits are now in use in different railway shops and car repair plants throughout the country and we should like very much to get detail information from these points as to just what results are being obtained. For instance, we should like to know the exact cost of repairing a body bolster or other part by this method, as compared to other methods; or, in cases where it would otherwise be necessary to scrap the bolster, the difference between the cost of a new one and the scrap value of the damaged one. Although the competition is closed, we should like very much to receive data as to just how the work is accomplished, and shall of course pay for such information on the same basis as we do for all other articles which are accepted. It is not necessary to send in a long story, or to cover all of the work which is being done in this way at your plant. Select one or two good details and send us complete information concerning them. This will not take a great deal of your time and you will be far more liable to get the article to us than if you try to go at it in a more ambitious manner.

THE general shop kink competition which has been announced in the last two Shop Numbers, will close September 15. In talking the matter over with some of the foremen at the various conventions during the summer, we were surprised to find that there was some misunderstanding as to the illustrations which should accompany the contributions. Anything will do as long as it shows the kink up in such a way that its construction and operation are clearly evident in connection with the description. In some instances blueprints are available from the company files; in other cases some one about the shop may be able to take a good photograph; in a great many cases pencil sketches are sent in. Of course it is much easier to handle these if the sketches are accurate and carefully made, but in case this is not possible, we have no objection to receiving rough sketches. Most foremen are not mechanical draftsmen, but all of them can make sketches of some sort or another. Do not be discouraged because the copy you fix up does not compare favorably with the descriptions that you see in the paper. It is safe to say that a good many contributors have trouble in recognizing their articles at first glance when they finally appear in the paper, the transformation is so great. Quite often in meeting a foreman at a convention, or in his shop, he will remark in an off-hand way that he has a much better way of doing a certain piece of work than someone else who had a description of his methods published in a previous Shop Section. If you find that this is true of any of the kinks that you see in the Shop Section, do not wait until you meet the editor to tell him about it, but get busy and write to him immediately, describing your method and calling attention to its advantages as compared to the one in the article that attracted your attention. In doing this, you will accomplish several things; you will assist the first contributor by drawing his attention to the fact that his methods may be improved upon; you will assist our readers by showing them a better method than the one that they have already learned about, and you will have an opportunity of establishing your reputation among them. The requirements for entrance to the shop kink competition are three kinks and a prize of $50 will be awarded for the best collection. More than three kinks may be submitted, but the judges will base their decision on what they consider to be the best three in each collection. A second prize of $25 will be awarded for the next best collection, and those articles that are not awarded a prize, but are accepted for publication, will be paid for at our regular rates.

MASTER BLACKSMITHS' ASSOCIATION

WHILE the nineteenth annual convention of the International Railway Master Blacksmiths' Association, which was held at Toledo, Ohio, about the middle of August, was a good convention, as compared to those of the other foremen's associations, it was held under serious handicaps, and because of this was hardly up to the standard of last year. Two other large conventions were held in Toledo at the same time and the hotel in which the Master Blacksmiths' convention was held was not at all suited to its needs. The room in which the meetings were held was small, poorly lighted and very badly ventilated. Unfortunately, the weather was also very warm, thus complicating matters seriously. It is to be hoped that the executive committee in arranging for the place of meeting next year will be more successful in selecting the headquarters, for no matter how well the members may have been prepared to present their papers or take part in the discussions, the conditions under which they were working were such as to take most of the fine edge off of any inspiration which they may have had. However, in spite of this, the convention proved to be a fairly good one, as may be seen by studying over the account of it in this issue.

For several years very little change has been made in the subjects which have been assigned for committee reports. This is unfortunate and should be remedied. While case hardening, for instance, is an important part of the work of a smith shop, it is

hardly desirable to have a dozen or more members asked to report on it year after year when there is little possibility of any new or important developments taking place. It is true that at the recent convention one member had a good report on this subject, but on the other hand, 10 of the 12 members of the committee had nothing to say, and during the past two or three conventions, although the subject has been assigned for report, nothing important has developed. The same thing is true to a greater or less extent of several of the other subjects which were assigned for consideration this year. Any one who has kept at all in close touch with railway smith shops during the past few years must realize that there have been a number of most important developments and that there are many things in connection with its operation which could be discussed by the foremen to splendid advantage, and moreover, would be far more valuable in producing a lively discussion than some of the time worn subjects on the programme this year. For instance, in the all-important problem of reclaiming scrap material, the smith shop foreman can prove a most important factor. If this subject were to be assigned and care were taken to have men on the committee who were doing good work along this line, a number of good papers could be presented next year and such a lively discussion be provoked that the higher executive officers would be forced to recognize the necessity of sending their master blacksmiths to the annual conventions.

The manufacture and handling of bolts is a most important part of the smith shop work at some of the central shops where a large amount of manufacturing is done for the system. There are two or three shops in the country that are far ahead of their neighbors in their methods of handling this work. The association could do splendid work by placing a description of the methods used in the best shops on record and in thoroughly threshing out this subject, so that those who are not handling the work to the best advantage could mend their ways and obtain better results.

The subject of tools and formers has been before the association for a number of years, and with good results, for each year a number of good tools are presented. Unfortunately, however, the association has no provision for preparing and distributing advance copies of the papers on the various subjects, and so when a member presents a paper on the floor of the convention it is not very intelligible because those present have not had an opportunity to study the blueprints or sketches to which the paper refers, and of course the one or two blueprints which the author may have with him cannot be seen by the members generally while he is reading his paper. For this reason the discussion of these devices amounts to very little and other members are not in a position to show that they have better methods for doing the same work. The suggestion has been made that more of these tools and formers and shop kinks, should be presented before the convention and in order that they may be properly understood and that the discussions concerning them may be of real value, that the papers with the drawings or photographs be sent to the secretary well in advance of the time of the meeting, and that he make provision to have them displayed on the walls of the meeting room before and during the convention. If the drawings or photographs were placed in the order in which the papers were to be taken up, the members would undoubtedly find time to study them over before the reports were presented. It might be well for each contributor to send in two or three, or half a dozen blueprints, so that they could be posted at different places in the room and small groups could gather around them before the convention opened and during the recesses.

There is another phase of this question of tools and formers which should receive serious consideration on the part of the association. Take the matter of forging machines, for instance. Drawings, photographs and sketches have been presented showing the design of tools and formers used with forging machines, and yet, with the exception of the Tool Foremen's Association, at its last convention, no effort has been made to place on record the fundamental principles of the design of such dies and formers. The smith shop foreman who is about to install a forging machine in his shop has very little to guide him in designing the dies and formers, other than the general suggestions which he may receive from the manufacturer, or of detailed drawings which the manufacturer may be willing to furnish him in some cases. The result is that when he starts to design a set of dies for a special piece of work he soon finds that he is in trouble because of some little knack in the design which could easily have been incorporated if he had had at hand a good report or paper on the designing of the dies and formers. There is no good reason why a number of men in the association who have had wide experience with the forging machine could not get together and outline suggestions which would be most helpful to their brother foremen.

The more extensive use of the forging machine within recent years has greatly multiplied the number of dies and formers in use at most railway smith shops. Indeed there are so many of these at some points that difficulty is found in locating the dies when they are wanted. A few shops have systematically arranged for the care of the dies so that they may readily be located, but many shops have been more or less careless in the matter. A description of the best methods in use for caring for these tools would be appreciated by many of the members of the association.

Flue work is one of the questions which comes up at every convention, and while the members give their experiences, no effort has been made to bring out and place on record the best and cheapest way of handling flues. It would seem that the committee which is appointed ought to carefully investigate the conditions with a view to placing on record a complete description of two or three of the plants in this country from which the best results are being obtained. While it is true that the committees appointed on the various subjects cannot work as they do in some of the larger associations, where it is possible for the members to get together once or twice a year, still this handicap could be overcome to a certain extent and some real committee work could be done through correspondence, if the members would make a determined effort to do so. The problem is one with which all of the smaller associations have to contend, but the railways at large seem to be waking up to the necessity of having their foremen visit other shops during the year, and it is possible that in the future better results can be obtained than has been possible in the past. There is no good reason, however, why, if all the committee members send contributions to the committee chairman, he cannot combine the information into one report cutting out all useless or unimportant information. These are only a few suggestions as to subjects which might be considered to better advantage by the association. There are many other practical ones of equal, if not greater, importance, but they will not be discovered unless a determined effort is made to get out of that rut and broaden the work of the association.

The association has a committee on parliamentary law, and it might be a splendid idea for other organizations of like character to have similar committees. The work of this committee is to outline the way in which the reports should be presented, to prepare instructions as to how the discussions of the reports or papers should be conducted and other parliamentary rules for the conduct of the meeting. Unfortunately the committee does not report until after the convention has actually opened. It might be far better to have the committee draw up such suggestions as it thought wise and submit them to the executive committee during the year and have the executive committee approve of them. In this way those who are interested in conducting the meeting would know in advance just what they were expected to do. Foremen, as a general rule, are not accustomed to presiding at conventions or meetings, or of taking part in them, and in order to handle the work of the convention efficiently

they should give the matter some thought and study and be prepared to act quickly and intelligently when they are called upon.

MECHANICAL ARTICLES DURING AUGUST

THE articles of special interest to our mechanical department readers that have appeared in the weekly issues of the *Railway Age Gazette* since August 4, and to which Shop Number readers may wish to refer, are as follows:

Steel Motor Coach for the Pennsylvania. A new suburban line between the Hudson Terminal building, New York, and Newark, N. J., will necessitate the Pennsylvania Railroad using a special type of car to meet the clearances of the Hudson & Manhattan tunnel. This car is illustrated and described on page 280, August 11.

Mallet Superheater Locomotives; Delaware & Hudson. Six of these locomotives have been in pusher service since June, 1910, and a short time ago four more locomotives of a similar design, but equipped with fire tube superheaters, were placed in service. Comparative data is presented showing the service of these engines as compared to that of the consolidation locomotives which they displaced. The method of operating and handling the Mallets is also described. August 11, page 291.

Mallet Locomotives; Duluth, Missabe & Northern. The details of eight Mallet locomotives having the 2-8-8-2 wheel arrangement, which have recently been placed in service on this road, are described on page 312, August 18.

Pullman Equipment for the Chicago Great Western. This road has recently received a number of Pullman cars, among which is a steel compartment sleeping car with an observation parlor for the exclusive use of women passengers; also a men's club car. Both of these are illustrated and described. August 18, page 320.

Heating Cars Containing Perishable Freight. A description of the various methods used for this purpose, abstracted from a paper presented before a meeting of the American Association of Railroad Superintendents by E. F. McPike, refrigerator service agent, Illinois Central. August 18, page 323.

Trainmen and Safety Appliances. A reader suggests that the repairs or defects to safety appliances and other parts of the cars could be facilitated at inspection points by having the train men inspect the cars for such defects during transit. August 25, page 365.

Ventilation of Sleeping Cars. Abstract of a valuable paper presented before the American Public Health Association by Thomas R. Crowder, M. D. A large number of experiments were made under various conditions, both with and without exhaust ventilators, and the results are presented fully and in graphical form. August 25, page 371. An editorial on car ventilation commenting on these experiments, appears on page 362 of the same issue.

Train Resistance. W. F. Kiesel, Jr., as the result of a number of years study and experience, has developed a formula on train resistance which should prove of considerable practical value. August 25, page 377.

Mallet Locomotive with 20 Drivers for the Santa Fe. The 2-10-10-2 type Mallet locomotives which were converted from Santa Fe type locomotives in the shops at Topeka, Kan., and which are by far the largest locomotives in existence, are fully described and illustrated in the issue of August 25, page 379.

Freight Cars for Shipping Transformers. A high capacity well-car for this purpose, built for the Westinghouse Electric & Manufacturing Company, is illustrated and described in the issue of August 25, page 381.

The Demands of the Western Shopmen. A full text of the demands presented to the officers of the Southern Pacific will be found on page 383 of the issue of August 25.

NEW BOOKS.

Temperature-Entropy Diagram. By Charles W. Berry, Assistant Professor of Mechanical Engineering, Massachusetts Institute of Technology. Published by John Wiley & Sons, New York. Cloth, 5 in. x 7½ in. Price, $2.50.

This volume is the third edition of Professor Berry's treatment of the temperature-entrophy diagram. It now consists of nearly 400 pages, minor insertions having been made in the chapters on the flow of fluids, the gas engine cycles and the non-conducting steam engine. The chapter on refrigeration and the warming engine has been expanded into separate chapters on each subject. Entrophy analysis in the boiler room has been added, as well as tables on the efficiency, water and heat consumption of the Rankin cycle. Professor Berry has for many years been deeply interested in the subject of the entrophy-diagram and his work has been of a very careful nature. With the increase in the use of the temperature-entrophy diagram, as against the pressure-volume diagram, this book will find a special field among the students of thermodynamics.

Letters to the Editor.

EFFICIENCY.

Savannah, Ga., July 19, 1911.

To the Editor of the Railway Age Gazette:

The practical results gained from the discussion of articles on scientific management which have been published during the past several months in the *Railway Age Gazette,* have been of enormous value, if serving as nothing more than a stimulus to renewed endeavor. In speaking of efficiency engineering I take it in the broad meaning of the word that it covers the most economical methods of doing work in our shops. It goes without saying that all of us are, and have been in the past, striving for this result; that some of the plans advocated are impracticable of application to existing conditions, also goes without saying. On the other hand, the whole subject is a very important one, and the keeping of it before us has certainly served to keep us alive to the situation and increase our endeavors to attain the desired end.

F. F. GAINES.
Superintendent Motive Power, Central of Georgia.

SMOKE ARCH BOLTS.

Chicago, Ill.

To the Editor of the Railway Age Gazette:

Any machinist who has sledged, stretched, beaten and pounded a set of smoke arch bolts for two or more days and then had to drill them out, will often wonder why there is not some easier method devised whereby a cylinder can be taken from the boiler in a much shorter time. In these days of feverish haste, when every effort is put forth to get the engine out of the back shop as soon as possible, some method should be devised to overcome this difficulty. It occurs to me that the remedy lies in the introduction of a bolt with such a taper, whatever that may be, that one or two vigorous blows will cause it to register against the opposite side of the smoke arch. Such a bolt has been met with the criticism that "the arch might be broken while driving the bolts in," and "a reamer with some taper is already used," but that taper happens to be only 1/16 in. to the foot. My suggestion is to make a bolt with a taper of ¼ in. in 4 in., or one that will drive out easily, and one that will securely hold the sheet, liner and cylinder flange. I think the difference of time in fitting this bolt will be more than compensated for by the time taken in removing it.

W. W. REEVES.

INSTRUCTION OF APPRENTICES AND HANDY MEN.

July 11, 1911.

To the Editor of the Railway Age Gazette:

Would it not be well for your Old Railroader (*Railway Age Gazette,* July 7, page 49) to develop his own efficiency men? His ideas of what ought to be are good, but this continual harping about what the college man gets and does is getting stale. The college man cannot last any more than the apprentice, nor can he make a success unless he gets down to the work. He has the advantage of education. How many shops or roads give an apprentice an opportunity to learn to write an intelligent report? Would it not be better to provide the boys with the opportunities than to expect them to buy the knowledge to read blue prints? If the boy's parents do not want him to work, if they are to pick the vocation, he is to be pitied. You have a nonentity to start with.

I know of a road that introduced apprentice schools. Two years ago the laborer's job at 15c. per hour was preferable to the apprentice rates or position. Since that time the boys have been attending the apprentice school. An average percentage of less than 75 for school work each week brings the young man in contact with the master mechanic, and, in justice to the boys,

there are very few of them that have to go to him. Each summer the boys have their baseball team and have Saturday afternoons for practice and play. One of the old apprentices or graduates is kept in the office of the master mechanic all the time—usually for about six month periods. He follows test and record work, checking tire wear, making drawings, etc. The first man fell down. The second was recently promoted to a gang foremanship, and he has increased the output of his department in an amazing way. The third is digging away. The third week in the office he asked permission to come to the office Sundays and evenings to get into the technical papers and reports for study. Today there are fifteen applicants for the next vacancy. If the boys show at the end of six months that they are not fitted for work in the school and the shop, they are dropped. In two years only one has been so handled. The boys appreciate their school, their ball team and their chances of advancement so that every one is working for that six months in the office or a chance to get to the drawing room or the main shops. The boys are paid full time for their school hours, and on Saturdays the ball team is so paid when the shop works at that time.

Change your methods to suit the times. Make your opportunities attractive to young men; let the successful applicant be the boy that has the highest mark on his entrance examination and while holding him strictly to his work use him as a human being. Keep educating him along every line possible, and we will not hear so many wails about the college men. There is a place for everybody. After a good many years experience I want to say that the old railroaders are more to blame for the decadence of the mechanic than anybody or anything else.

There are plenty of bright American boys out of high schools who want to get into this work. They will make the best efficiency men. In six months one of these boys at the point above mentioned was promoted to assistant apprentice instructor. The assistants for locomotive and other tests on the road are picked from the school. Move up the men on their rating of efficiency and you will be amazed at the knowledge of the boys, their eagerness to get ahead and their desire to have the banner school on the road. Foster this spirit, because no foreman can make mechanics unless he has the material to work with. Officials above the foremen have got to do their part.

ANOTHER OLD RAILROADER.

TIRE HEATERS.

CLEVELAND, Ohio, August 12, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read several descriptions of tire heaters in the *Railway Age Gazette,* most of which are very easily rigged up; but I think we have the simplest and easiest rigged up device, and that it gives as good, if not better results, than any so far described.

It consists of an oil tank, similar to those described, using crude oil. The air is supplied to the tank by 1 in. hose with ¾ in. nipple connections. The oil is controlled by a needle valve, which connects to the ¾ in. air line leading to the burner. This air line is supplied by a T connection from the air supply to the tank, and is controlled by a ¾ in. valve.

The burner is made of 1¼ in. pipe bent to the shape of the tire, with ⅛ in. holes drilled 2 in. apart. The ends are left open and are about 8 in. apart. The hose supplying the mixture is reduced to ⅜ in. with a T connection with nipples 10 in. long, which are placed in openings of the burner. The air supply is at about 80 lbs. pressure. After the fire has burned one to two minutes, the air supply is turned on full. This gives a very hot fire, and a tire is heated so it can be removed in 8 minutes. It may be of interest to note that this same arrangement was used with all connections ⅜ in., but it took 30 to 40 minutes to remove a tire.

E. L. DUDLEY,
Machine Shop Foreman, B. & O.

ESTABLISHING AN EFFICIENCY SYSTEM.

July 20, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

If the management of any large concern announced that its shop costs were extremely high and that an efficiency engineer was to be employed to find out the cause, every man in the shop would be "up in the air." But, on the other hand, if the management announced that its shop costs were high, and that it would like to check up the shop conditions, and desired each man in a supervising position to furnish an itemized account of the number of men he handled, together with a record of their rate of pay, age, kind and amount of work handled, and speed of machine (if any) operated, I am sure that some very surprising information would be secured. This is the first step in establishing an efficiency system, and I am sure that every foreman would be glad to assist in making this check. After securing this information, the work should be checked so as to simplify and systematize, cutting out all unnecessary moves.

Every concern, whether it be a private manufacturing plant or a railway shop, has foremen who handle their work along personal lines, regardless of the fact that they waste a lot of time and money. As an example take the blacksmith shop: One foreman may claim that it is cheaper to forge a certain job and dress it so that there will be no machine work required. Another foreman will claim it is cheaper to forge and leave a small amount to be finished on the machine, while still another will claim the cheapest way is to block out a rough forging and let the machine do all the finishing. This is a situation where the efficiency engineer can make a good showing. After checking up all the conditions that may effect this work, he can render a report that shows the cheapest method, regardless of the opinion of the blacksmith foreman.

In some plants new equipment is installed, but no advantage is taken of the better facilities. In a large manufacturing plant the entire tool equipment was replaced with high speed steel, but no change was made in the speed of the line shaft or in the sizes of the drive pulleys. The result was that the shop costs were increased, but no apparent increase in output was noticed. An efficiency engineer was employed, and the first thing he recommended was to have the machines speeded up.

In another large shop that was divided into several departments, considerable trouble was experienced in getting material trucked from one department to another. A careful analysis of the situation showed that while each department had 2 or 3 men whose sole duty it was to truck material, each gang waited for the other gang to deliver first. In this case all the men were formed in one gang under a leader, and a schedule was made so that the entire gang went to each department every hour and delivered or removed the required material. After working this way for one month it was found that 50 per cent. of the truckers could be taken off and still get the work done quicker than before. Take the belt question:—How do you know that you are not losing money on this one item if you do not keep a record of your belts? Check over your plant and see if you are not using leather belt in some damp place where a rubber belt would last longer and cost less to buy. Perhaps a machine is equipped with double belting, where single belting at one-half the cost would give better service.

In starting out on the efficiency idea, remember the old saying about foremen—that the best workman does not always make the best foreman. Perhaps an expert mechanic will start an efficiency system and base his results on the difference in speed of the regular operator and his own. This record makes a nice showing, but no good results are obtained. After the expert has left, the regular operator finds that he cannot handle the work as fast as the expert, and if the job is on a piecework basis he will not be able to make his regular rate. This kind of an efficiency system is a failure. The better idea to work out is to study any situation and simplify or systematize the work so that the regular operator will be able to increase his own work. Take

a planer job for example:—You may find that the reason why the operator does not turn out more work is that he does not take any heavy cuts, and that the reason why he cannot take heavy cuts is that he does not clamp his work on the machine properly. This man will learn more by having the reason of why he cannot take heavy cuts explained to him than he would learn in watching an expert do several jobs. He might be able to do the same job that the expert did, but if a different shaped job came along he would be lost, for he would go back to his old style of clamping.

In starting an efficiency system do not look for results too quickly. We all know that by investing a large sum of money in improvements work can be handled cheaper and quicker, but the successful efficiency system is the one where results are obtained in a quiet manner and without any great outlay of money. Explain to each workman that you are anxious to increase your output, but that you do not want him to think you intend to take it out of his "hide," but rather to take it out of the machine he is running. Perhaps this same man can offer some very valuable suggestions. Very often small jobs are overlooked in the haste to correct the big jobs, but while the big job is only done occasionally, the small one is handled daily, and more saving can be made by correcting the small job first.

"OLD TIMER."

RECLAIMING SCRAP MATERIAL.*

BY A. A. BURKHARD,

Assistant General Foreman, Car Department, New York Central & Hudson River, West Albany, N. Y.

There is a wide difference of opinion as to the economy in working up and using scrap and second-hand iron. To the writer there does not appear to be any question from a saving standpoint, or from the standpoint of safety when stock is used for certain classes of work. About two and one-half years ago we installed our present scrap platform at West Albany. At a plant the size of that at West Albany it is an easy matter to accumulate enough old second-hand materials to build almost any kind of a building. The building itself is, therefore, virtually made of second-hand and scrap materials. We accumulated enough old car sills for the framework and enough old corrugated iron from various parts of the road for siding. We then got hold of an old locomotive tank and boiler that had outlived their usefulness and an old second-hand pump and dammed up a ravine; our present water supply is from this source.

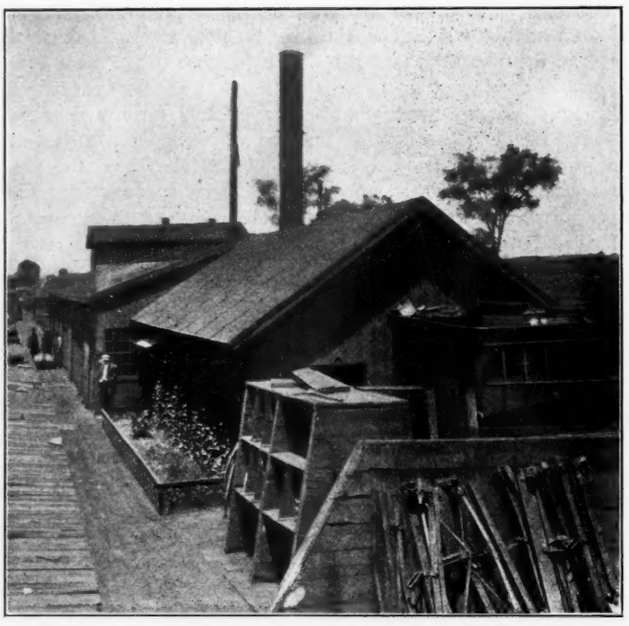


Fig. 2—Part of the Buildings at the Scrap Platform.

The reclaiming of material suitable for freight car repair work is handled by a man who is thoroughly familiar with all kinds of freight car castings and forgings, and he keeps in close touch with the store department. In this way we accumulate and keep in stock enough of this class of material to meet our

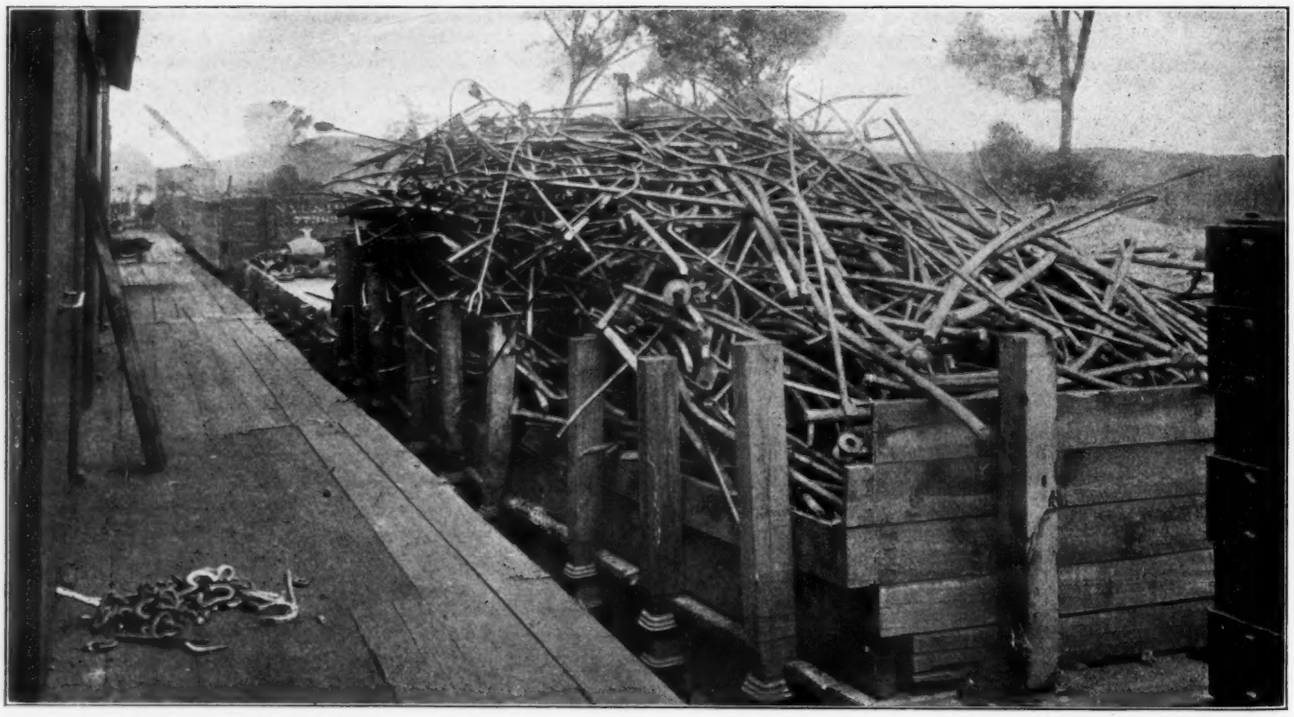


Fig. 1—Scrap Round Iron Ready to be Cut Up and Straightened for Various Purposes.

*Submitted in a competition on this subject which closed July 15, 1911, and awarded the first prize of $35.

demands and no more. All staple classes of material are, of course, reclaimed in larger quantities, the obsolete types being consigned to the scrap. We have a car demolishing plant five miles from the present scrap platform, where in the neighbor-

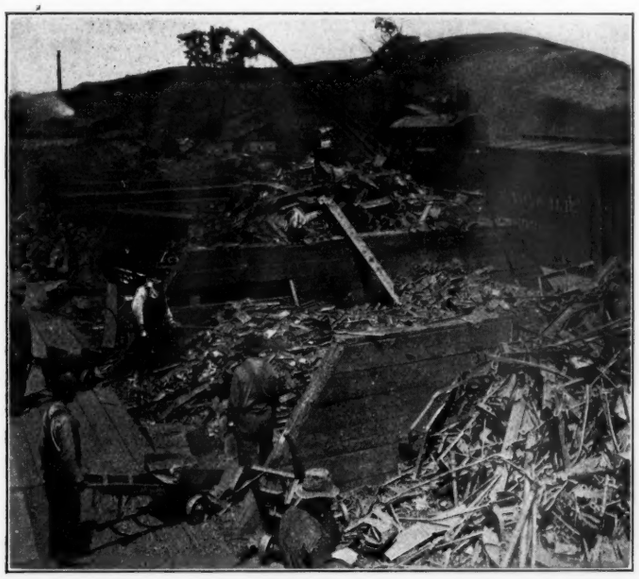


Fig. 3—A Few of the Bins on the Scrap Platform.

hood of from 30 to 50 cars are demolished per month. These are of the old and lighter types. This scrap, together with everything accumulated within a radius of 300 miles finds its way to the scrap platform; it would be difficult to describe the different kinds of this material. Locomotive, building and bridge, passenger and freight car, electric material, and, in fact, everything used on a large railway system may be found there.

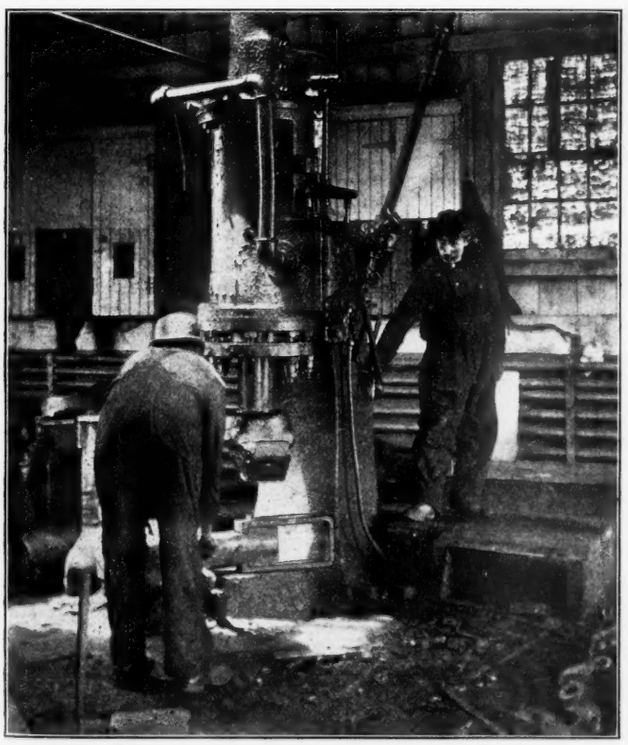


Fig. 4.—Removing the Yoke From a Coupler.

We have installed a number of machines and work that was formerly blocking the blacksmith shop is now being performed at the scrap platform, and the blacksmith shop is practically free of the old second-hand accumulations. Disposition of everything is made right at the scrap platform. It is either scrap or it is good. We have two hammers, one heavy and one light, which are used for straightening all kinds of iron, separating couplers from pockets, applying pockets to couplers, and, in fact, everything that a hammer can be used for. There are two blacksmith forges and one heavy coke furnace, which are used for heating iron for making all kinds of shapes, repairing brake beams, repairing train chains and other kinds of repair work that can be handled economically. We also have a heavy shear at the outside of the building, where all kinds of heavy "rounds" and bars are cut to the suitable lengths, and which is used for separating cast from wrought and malleable scrap, etc. A light punch and shear is used for cutting old bolts to suitable lengths. A nut tapping machine is kept busy at all times retapping the large accumulation of second-hand nuts.

It would be impractical to go into detail and give all the operations performed at the scrap platform, but it has reached such proportions that we could not handle the work in the blacksmith shop if we attempted to do there what is now being done at the scrap platform. Fig. 1 shows an old flat car with an accumulation of sorted round iron ready to be cut up and

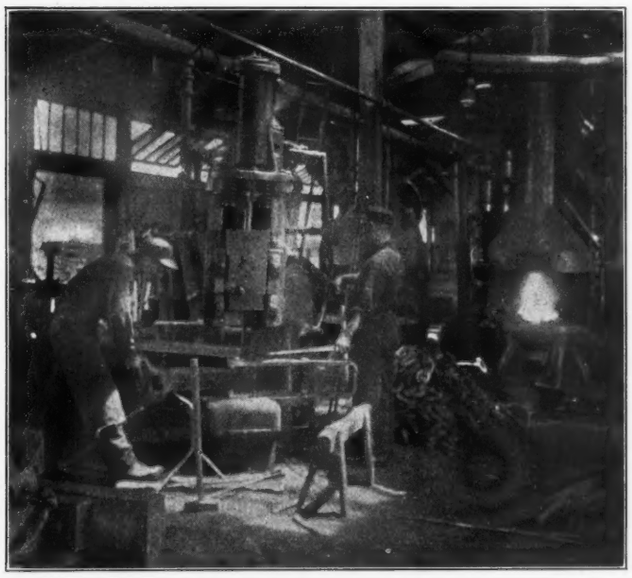


Fig. 5—Riveting a Yoke to a Coupler.

straightened for various uses. A small portion of the scrap platform buildings, which cover an area of 200 ft. x 60 ft. is shown in Fig. 2. The west end of the platform bins used for different classifications is shown in Fig. 3. It also shows the self-propelling hoisting machine which is equipped with a magnet.

Two of the force dismantling an old M. C. B. coupler pocket from the coupler is shown in Fig. 4, while Fig. 5 shows them riveting up an old Miner pocket to the same coupler. This work is to be performed in the future by a pneumatic home-made bulldozer, which has been made at West Albany and installed for such purposes and the straightening of brake beams, etc. A heavy shear separating pieces of wrought from malleable iron is shown in Fig. 6. Three iron racks made of second-hand 1 in. x 4 in. flat iron and angles are illustrated in Fig. 7. They are filled with second-hand wrought iron which has accumulated at the scrap platform. A section of a new iron rack which is being built to take the place of an old wooden one, which is 100 ft. long, is shown in Fig. 8. The new iron rack will be built entirely of second-hand iron.

A lot of shapes used in large quantities in the freight car repair shop and made entirely of second-hand iron are shown in Fig. 9. They include a set of coal car side stakes plated with light ½ in. x 4 in. arch bar tie straps and 1 in. x 4 in. arch bars.

We have a large number of wooden coal cars that have been giving trouble, and we have found these to make an ideal side stake. Brake hanger pins, truss rod extensions, end sill and end plank hook rods, bolster hook rods, brake levers, brake

Fig. 6—Heavy Shear on Scrap Platform.

hangers, dead lever guides and anchors, coupler striking face plates, coupler carrier irons, draft timber cross tie straps, body tie rod clips, foot board brackets and brake connections used on our standard 80,000 lb. capacity coal cars and 60,000 and 80,000 lb. capacity box cars to which we are applying the heavy Miner draft gear are shown. We use thousands of these pieces each month, and the shapes that we make from old second-hand iron are just as good as if the iron were brand new. Box car door angle braces are accumulated from various sources, and are applied to box cars passing through the shops on account of the doors warping. You will notice the bottom of the door partially shown in the background, is equipped with a heavy wear iron. These we make out of old engine flues, flattening them. We also make square washers for freight car repairs from old engine flues. Box car side bearings used on some of the older equipment that has wooden body bolsters are made from old arch and tie bars.

It is impossible to show everything we make, and a few of the operations performed at the scrap platform that are not shown in the photographs, are as follows: Old M. C. B. follower plates are straightened and cut into sizes suitable for tandem gear. Jaws from old brake rods are cut off and made into suitable lengths. Knuckle pins are straightened. Old passenger car transoms are used for coupler face plates. Old flat iron from 1 in. x 4 in. to 1 in. x 6 in. is used to make truss rod twin washers. Center pins are made from old roller bars and brake staffs from 1¼-in. hog iron. Discarded eye beams, 8 in. x

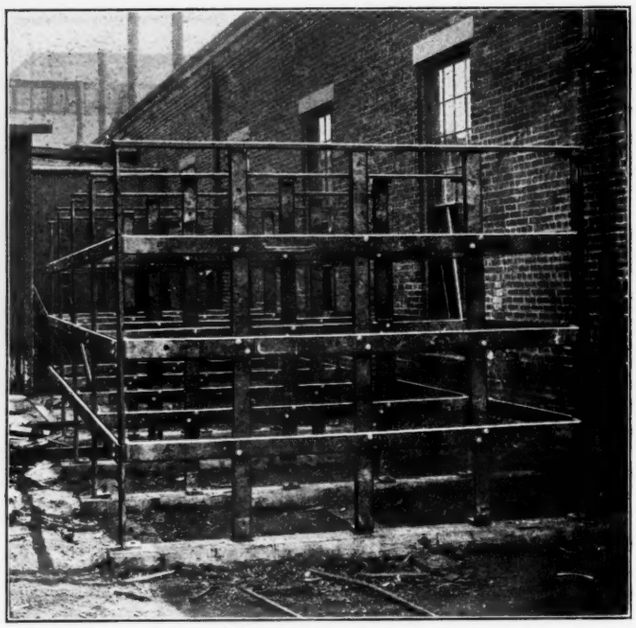


Fig. 8—A New Iron Rack in Course of Construction.

12 ft., are reclaimed from trucks to make caboose draft arms. Eye beams from standard steel platforms on coaches are used for caboose draft arms. Old discarded sill steps, too short for the present safety appliance standards, are made into running board brackets. Old accumulations of corrugated iron are used for spark shields under passenger equipment. Old boiler plates are used for coal car roller bar plates. Old channel irons 8 in. to 12 in. wide are utilized for reinforcing pressed steel flat cars.

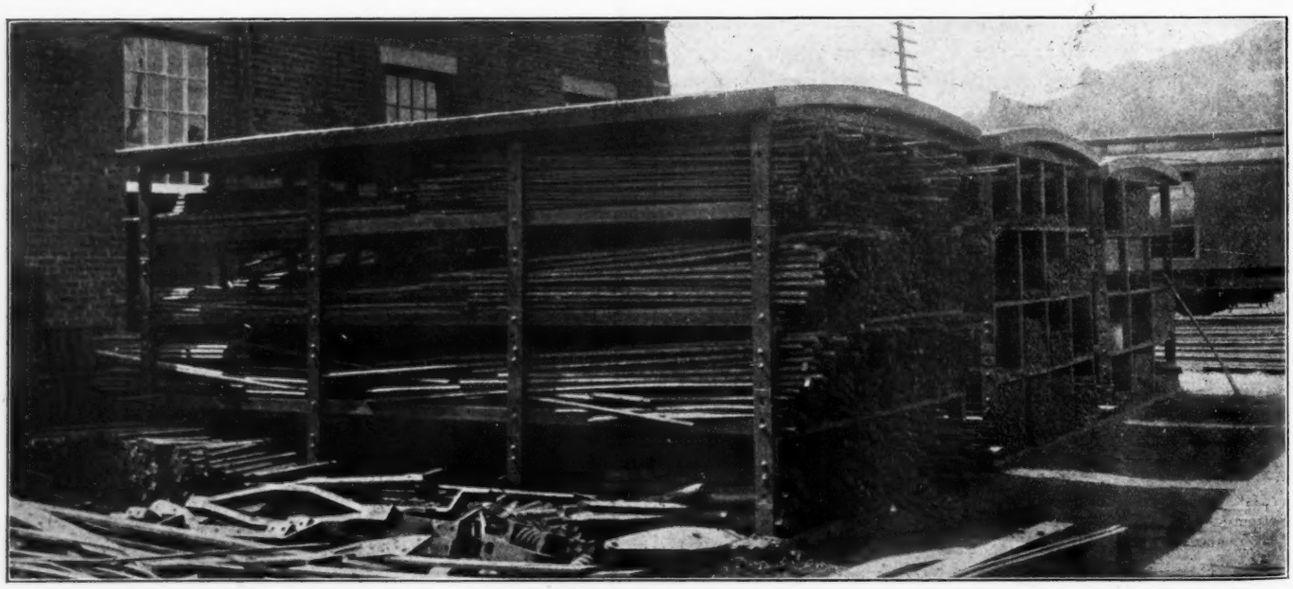


Fig. 7—Iron Racks for Storage of Second-Hand Wrought Iron.

This is just a sample of the various uses to which we apply accumulated second-hand iron.

Fig. 10 shows an 80,000 lb. capacity coal car equipped with the different parts that we make from second-hand iron, these parts being marked white. We have from 40 to 45 cars of this kind through the shops for general repairs and the application of the heavy gear every month, and are now starting the application of the heavy gear to all of the better equipment both box and coal. We will be able to make all the parts of second-hand iron, as there is a large accumulation of the sizes needed.

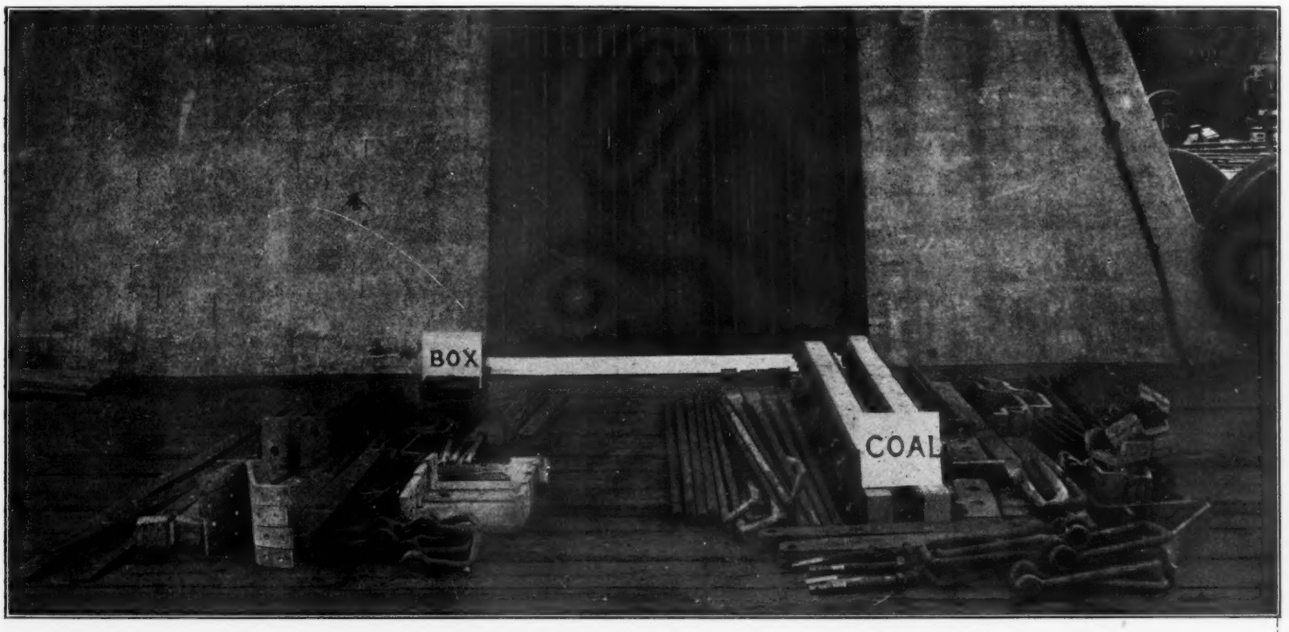


Fig. 9—Freight Car Parts Made From Second-Hand Material.

Following is a statement of savings effective by the reclaiming and re-using of second-hand material from January 1 to June 30, 1911.

Article.	Made from.	Amount derived if sold for scrap.	Number made.	Cost if made from new material.	Saving to the company by using second-hand material.
Carry irons	Arch bars	$1,323.00	7,150	$4,290.00	$2,967.00
Side bearings	Arch bars	1,498.50	9,435	4,906.20	3,407.70
Cross tie straps	Tie bars	1,350.00	9,650	4,439.00	3,089.00
Hook rods, 1¼ in.	Truss rods	621.00	4,180	2,006.40	1,385.40
Cross tie rods	Truss rods	229.50	1,895	758.00	528.50
Running board brackets	Sill steps	121.50	2,550	408.00	286.50
Coal car stakes	Tie bars	6,210.00	11,250	20,250.00	14,040.00
Twin washers	Arch bars	810.00	9,875	2,587.50	1,777.50
Truss rod clips	Tie bars	459.00	9,550	1,528.00	1,069.00
End strap rods	Tie rods	324.00	4,450	1,068.00	744.00
Head block plates	Passenger side bearings	1,390.50	3,745	4,568.90	3,178.40
Wear irons	Flues	2,791.10	5,435	3,543.50	752.40
Washers	Flues	30.60	5,750 lbs.	103.50	72.90
End posts	Steel rails	1,125.00	200	1,975.75	850.75
Draft arms	Dismantled platforms	81.00	210	1,470.00	1,389.00
Box car door angle	Angles	45.90	640	405.60	359.70
Springs	Dismantled Class "F" trucks	40.50	850	178.50	138.00
Safety strap	Tank bands	108.00	1,410	366.62	258.62
Built new iron rack	Arch bars	324.00	1 rack—4 sections	1,766.40	1,442.40
Freight couplers		98,457.50	15,455	135,231.25	36,773.75
Freight pockets		4,981.50	10,150	24,360.00	19,378.50
Knuckle pins		310.50	10,025	1,002.50	692.00
Follower plates		612.00	3,000	1,800.00	1,188.00
Brake levers		1,224.00	5,785	3,471.00	2,247.00
Brake jaws		94.50	3,175	317.50	223.00
Bolts—all sizes		29,437.20	4,232,510 lbs.	84,650.20	55,213.00
Brake beams—all kinds		4,100.00	18,250	46,537.50	42,437.50
Train chains		4,730.40	34,750	69,500.00	64,769.60
Nuts		1,683.00	245,630 lbs.	6,140.75	4,457.75
Head block angle iron		459.00	2,175	1,044.00	585.00
8 in. channels		810.00	1,125	2,250.00	1,440.00
I Beams		1,740.30	2,150	4,370.50	2,630.20
Truss rods		1,345.10	950	16,570.80	15,225.70
Bottom connections		1,012.50	5,535	3,321.00	2,308.50
Brake shoe keys		40.50	7,180	143.60	103.10
Total		$169,921.10		$456,330.47	$286,409.37

Total saving for the company, $286,409.37.

We are operating the entire freight car repair department without utilizing new iron for anything but coupler pockets and some of the larger bolts. A careful study of the reclaimation work for the past three years has resulted in an incredible reduction of expenses. The argument is often advanced that the increased labor entailed in working over old iron offsets the difference between the cost of new iron and the price obtained for scrap. Such is not the case. At West Albany we convert 1,000 lbs. of scrap iron for $.80, which includes supervision, maintenance, etc. Add this to the scrap value ($6) and it will be seen that a saving of $8.20 per 1,000 lbs. is effected, as new iron costs at least $15 per 1,000 lbs.

The remolding of scrap asbestos into commercial sizes of pipe covering and the utilization of scrap rubber for matting, etc., is now receiving our attention. In fact, the reclaiming of old materials proves to be the most interesting part of our daily routine.

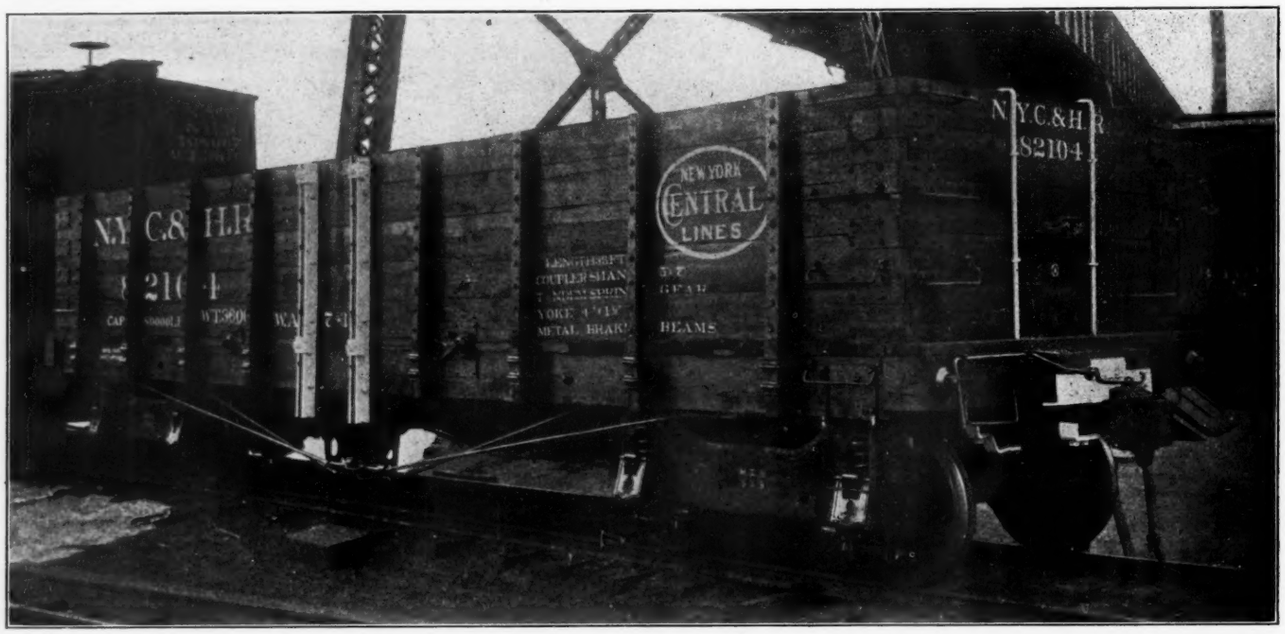


Fig. 10—The White Parts Are Made From Second-Hand Material.

ECONOMIES OF THE SCRAP YARD.*

BY C. C. LEECH,
Foreman, Pennsylvania Railroad, Buffalo, N. Y.

Does it pay to reclaim second-hand parts of cars and locomotives? Yes, if the conditions are right, and they are properly maintained. By this, we mean (1) that a yard must be of sufficient size to allow ample room for bin and platform space; (2) ample track facilities, both for loading and also the unloading of scrap sent in from along the road; (3) plenty of room for the yard or shop laborers to wheel in scrap gathered up daily about the yard or shop to any desired bin or place; (4) a system of tracks and light platform cars for quickly moving different varieties of scrap to the more remote points in the yard; (5) a power crane for expediting the handling of heavy material. Lastly, and of great importance, an intelligent man must be in charge of the department to judge the scrap when it is unloaded, consigning at once to the bins that which is of no further use, or that which it would not pay to fix over, and sending the usable scrap to the alloted places on the platforms, where it may be laid out and classified and be instantly found when wanted. Such material as may need straightening or other repairs can be sent to the shop at once, and afterwards be returned to the scrap yard platform or to the regular storeroom, according to the system followed.

Classifying the Scrap.—Large quantities of good iron of various dimensions comes in constantly from cars and trucks that have been in wrecks, or that are torn down. If this iron is sorted, reclaimed and left separated according to size and kind, much time and labor are saved. The usual plan is to crowd all kinds and sizes of one class of scrap into a designated bin, where it is next to impossible to get at the particular size wanted without loss of time and extra labor, with consequent extra cost. The spectacle of several men tearing out a lot of scrap iron trying to find a particular kind or size, is certainly not edifying nor conducive to a good, economical system in the scrap yard.

System of Accounting.—Under ideal conditions the scrap yard should be conducted on strictly storehouse lines, both as to handling and accounting. That there is money in the scrap proposition is undeniable, as witness the many scrap yards scattered all over any large city, and note the variety of scrap material, ranging from boilers of all descriptions and ages to bolts of all sizes and lengths. That there is also much loss due to a poor system of handling, or rather lack of system, is also undeniable.

Reclaiming Scrap Bolts.—Many roads reclaim all, or nearly all, scrap bolts. The writer knows of one company doing this at an average cost of 1.3 cents per pound, very much below the cost of new bolts. Even that figure can be reduced by improvement in the system of handling. Too many operations will cut into the profits. The company referred to has laborers gather up the old bolts of all kinds and sizes from the tracks and yards where car repairs are made. They are thrown into a car along with other scrap material. When the car is unloaded, the bolts are loaded into wheel-barrows and taken to the bolt shop, There they are classified in square, symmetrical piles, sometimes six feet in height, very nice to look at and pleasing to the eye, but expensive. From here they are picked over and taken to the bolt shearing machine, and cut off to required lengths; for example, an 8-in. bolt is cut to 6 in. in length, thus doing away with the old threads and allowing new ones to be cut in the threading machine. The straightening is quickly done under a small steam hammer.

While the operations of shearing, straightening and thread-

*Entered in the competition on Reclaiming Scrap Material, which closed July 15, and awarded the second prize of $20.

ing must of necessity go with the reclaiming and re-use of old bolts, and the quantity turned out is dependent on the facilities and the speed of the operators, the operations incident to the delivery of the old bolts to the shop will certainly stand improvement. An ideal method with which the writer is familiar is to fit up an ordinary gondola or box car, the latter preferred, with bins so that when the bolts are loaded they are thrown into the proper bins at once and are classified at the start, each bin in the car being plainly marked. Similar bins are provided at the bolt shop and the bolts are unloaded directly into these. No piling or sorting is necessary. Carrying out this idea of scrap classification still further, another car is provided with bins for scrap of various kinds, such as wrought iron, steel, cast iron, couplers, etc. Placed at a convenient point in the repair yards, or moved about when expedient, it is an easy matter to have the various kinds of scrap material thrown in the proper compartments in the car, and the scrap is thus classified at the first handling. Two or more old cars that have been condemned for road service can be assigned to the shop department and be cheaply fitted up for these scrap cars. This provides a car for loading while one is being unloaded at the bins.

Scrap Car Axles.—Most roads that have shops of considerable size manufacture a large amount of material for freight car repairs. Good and economical use is made of scrap iron axles and some steel ones in the manufacture of standard freight car material and locomotive parts.

Reclaiming Old Nuts.—The writer is familiar with a large road that had never made any use of scrap nuts. Some time ago a system was installed at a repair point of considerable size, a laborer being assigned to pick up all the old nuts and put each kind in a box of convenient shape, holding from twenty-five to fifty pounds. These boxes when filled are delivered to the shop and the nuts, already sorted and classified, are retapped on a high-speed nut tapping machine at an average cost for all operations of one cent per pound, as against two cents per pound and more for new nuts purchased. It is not unusual to thus reclaim three thousand pounds of nuts in a month. Certainly some saving in that.

Car Wheels.—The question of the expeditious and economical handling of scrap wheels is a difficult one with most shops. There is seldom room enough for the storage of more than a few hundred wheels at a time; there should be space for many times more. Long delay in moving the wheels or in loading or awaiting orders to load, or holding wheels for a better price, causes so much extra handling, and interferes so much with the entire system of wheel production that in many cases the profits resulting from the sale of scrap wheels are very much reduced. If conditions can be made to conform, there is but one ideal way of handling scrap wheels, and that is directly from the dismounting machine into the cars, the loading platform being on a level with the wheel shop floor, and the loading tracks so arranged that the floor of the car is level with the platform and the distance from the wheel shop as short as possible. As each wheel is pressed off at the dismounting machine it may be rolled directly into the car with one handling. Or, if happily, there is room for a loading platform of very generous width and length, a large number of wheels can be stored, awaiting disposition, though this means handling each wheel twice. The writer is familiar with a road that always handles each wheel three times, and sometimes four, in the process of dismounting and final loading on the car. It does not require very much business acumen to figure out the resultant loss with this kind of a system.

Borings and Turnings.—Another difficult and vexatious problem is the proper handling of the borings and turnings accumulating from the different machines in the shop. Here we have the problem of separating the various metal turnings, including steel, wrought iron, cast iron, malleable iron, and very likely several varieties of brass and bronze. In a large shop where the brass work is usually assigned to certain machines, iron forgings to another group, steel work to still another, and so on, not much difficulty arises. It is in the small shop where a large amount of work must be turned out on a small number of machines that the trouble occurs. It is impossible to do otherwise than to give each machine a variety of work, the material of which may be steel, brass, iron forgings and cast iron, all in one day, or, indeed, in the short space of several hours. Where this class of scrap is sold the buyer possibly wants all steel, and does not want it mixed with cast iron, or does not care to buy a carload of wrought iron turnings and find a large percentage of brass in the center of it. Where one machine has to be used for so many different classes of work and kinds of material, there is bound to be some mixture, even with extreme care, but it can be kept to a minimum. If there was time to clean the machines and carry away the turnings between each piece of work, the problem would be easy, but in the interest of speed and economy this is not possible.

A fairly good plan, adopted by the writer, is to have boxes made for lathes and other machines where it is possible to use them, to go under the machine. The box is as long as can conveniently be managed and of a width not to interfere with the operator. The depth should be about 6 in., depending on the vertical space under the machine or lathe. The lathe box, for illustration, is partitioned through the center at right angles to its length into two compartments. A sliding cover is made large enough to cover one compartment at a time. Thus, when one end of the box is being used for cast iron turnings, and the next piece of work put in the lathe is steel, the box can be quickly turned end for end; the sliding cover is then pushed over the cast iron compartment and all mixture is prevented, the steel turnings dropping down into the other half of the box. The box should be of such height as to allow room between it and the under side of the lathe bed for a good sized pan made of heavy galzanized iron. This can be used when both compartments of the box are occupied and another kind of metal is to be worked on. These pans should be large enough to cover the open end of the box. Placed thus directly under the work a large percentage of the turnings and borings will drop into the pan. If it is necessary after the piece of work is finished to work on still another kind of metal, the pan may be quickly removed and another one substituted. It is the duty of the shop cleaner, or attendant, to take up the filled pans or boxes and deposit their contents in the proper scrap bins, which should be done every day.

Looking over the situation, then, as outlined above, we find the following essentials necessary to the successful handling of the scrap problem: Plenty of room must be provided; economy in handling should be looked after; a plain and simple system of accounting must be used, and it pays to have intelligent and competent supervision to obtain the best results.

There are now in operation two important Chinese state railways. One is from Pekin by way of its harbor Tsientsin northward to Mukden in Manchuria, with a branch to Ninchmang, the harbor at the head of the gulf of Pe-chi-li. The Japanese authorities, in possession of the South Manchurian Railway, a little further east, have diverted to it the chief southbound traffic of that part of Manchuria, consisting of beans, bean oil and bean-cake, and the country suffered from inundations, in spite of which the earnings of the Chinese Northern Railway for the 15 months from October 1, 1908, to the end of 1909 were $7,172,600, which was more than ever before. The working expenses are reported as only 31¾ per cent. of the earnings. The other state railway is the line from Pekin to Hankow, built by a Belgian company, but taken over by the government afterwards. Its gross receipts were $5.513,205 in 1909, which is 4½ per cent. more than the year before and 24 per cent. more than in 1907. The net earnings were 33 per cent. of the gross, 7 per cent. more than in 1908, and 13 per cent. more than in 1907. This road was not worked by the state until 1909.

SHOP KINKS

TEXAS & NEW ORLEANS AND GALVESTON, HARRISBURG & SAN ANTONIO.

BY FRANK GALVIN,

Master Mechanic, T. & N. O., Houston, Texas.

RADIAL ATTACHMENT FOR SLOTTING QUADRANTS.

A device for slotting reverse lever quadrants is shown in Figs. 1 and 2. It consists of an arm clamped to the bed of the slotter in which slides an adjustable fulcrum which may be clamped

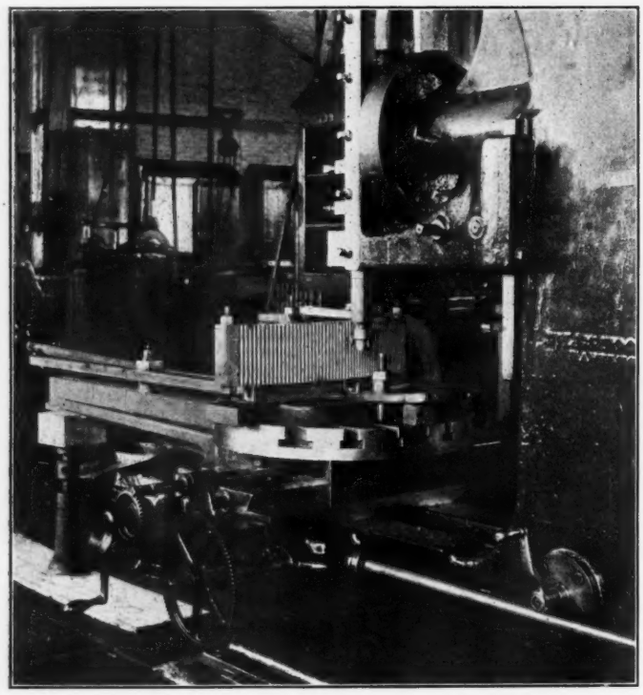


Fig. 1—Radial Device for Cutting Teeth in Quadrants.

to give the desired radius. An ingenious contrivance made with a nut, a screw and a suitable index plate is used to insure the proper spacing of teeth. By this improvement considerable time is saved, and all the quadrants are cut with standard teeth. With this device the accurate adjustment of the quadrant may

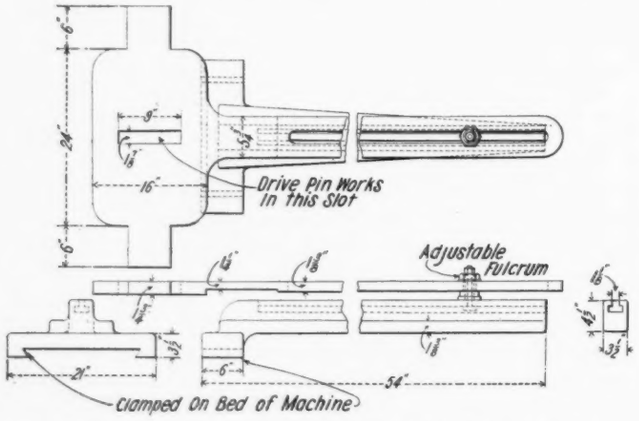


Fig. 2—Radial Attachment for Slotting Machine.

be quickly made and from four to eight quadrants may be slotted at one time. The table on which the work is clamped is driven by a pin working in a slot as shown, which allows it to turn about the out-board center.

JIG FOR SHAPING ROD BRASSES.

An attachment to be used on a shaper for machining rod brasses is shown in Figs. 3 and 4. It consists of a heavy angle block rigidly clamped to the table of the shaper. The brasses are clamped to the plate *B*, which has a bearing in the vertical leg

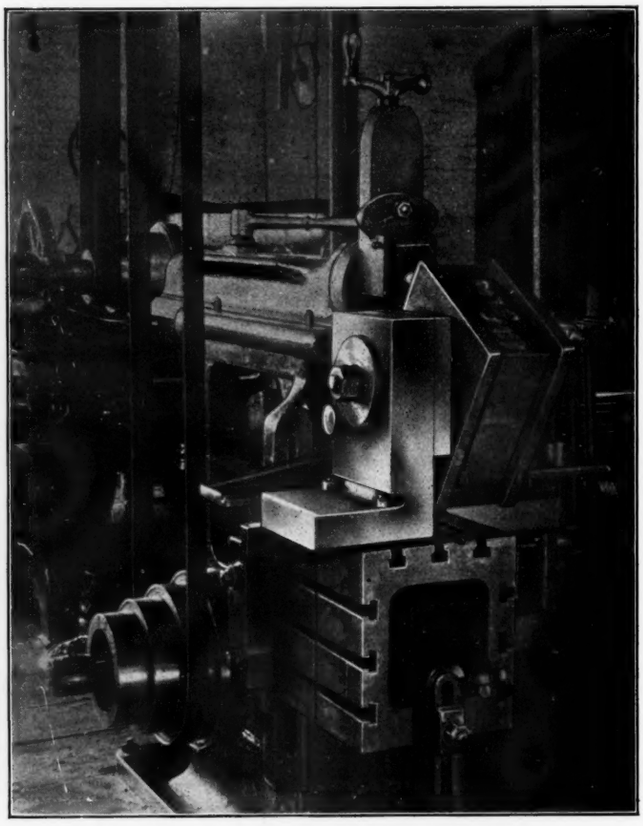


Fig. 3—Angle Chuck for Shaping Rod Brasses.

of the block. This plate is free to swing, and has four tapered index holes for a hardened steel pin extending through both block and plate, locating the four faces of the brass 90 deg.

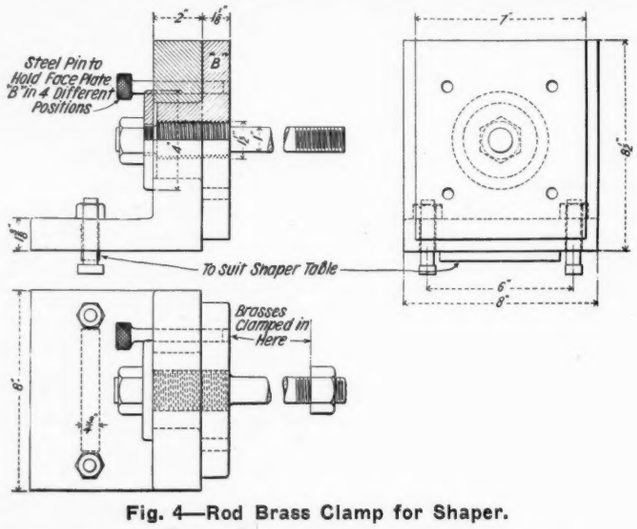


Fig. 4—Rod Brass Clamp for Shaper.

from each other. While the brass is being machined, it is clamped to the angle block by the 1-in. bolt as shown. With this device the brasses may be finished accurately on all sides with one clamping.

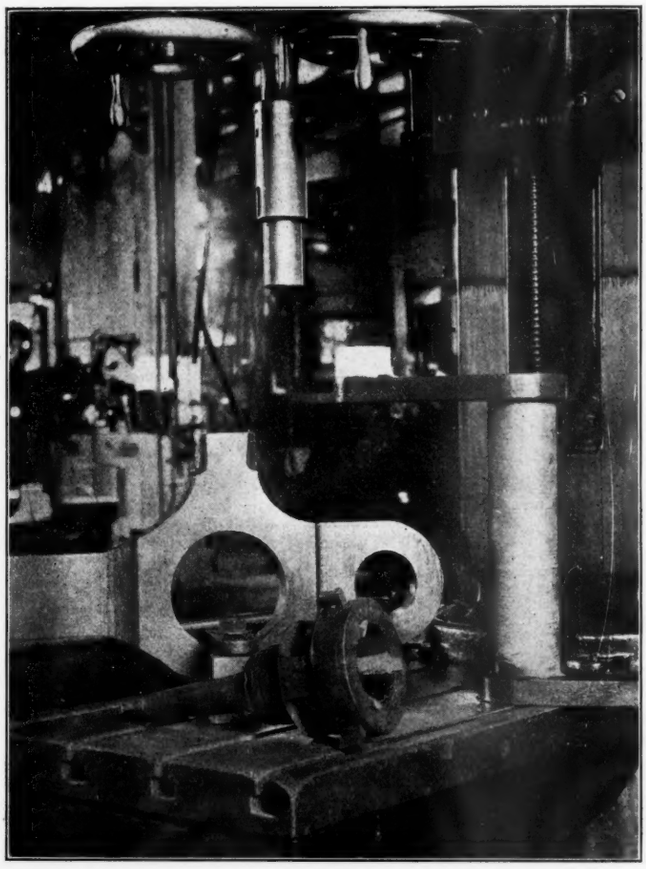


Fig. 5—Tool for Turning Ends of Rocker Arms.

GANG TOOL FOR ROCKER ARM BOSSES.

The tool shown in Figs. 5 and 6 may be used to advantage both for turning the ends of rocker arms and turning the solid grease cups on side rods. Its shank is made to fit the drill spindle.

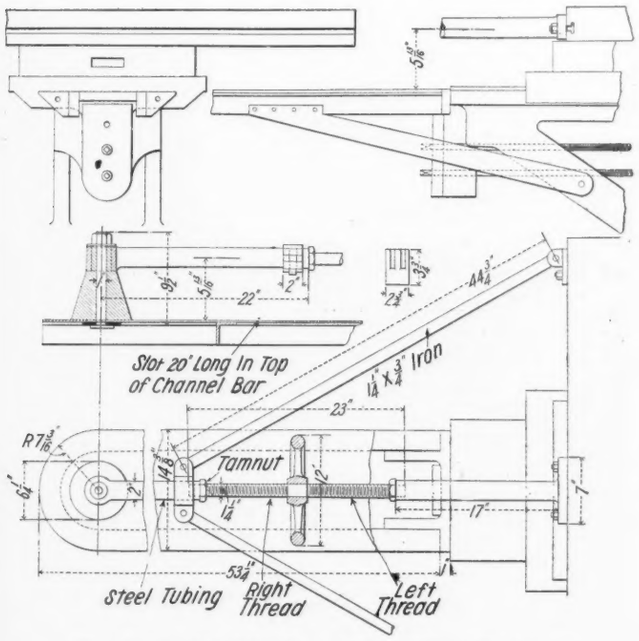


Fig. 7—Radial Attachment for Milling Machine.

The tools are placed in horizontal slots in the body and are clamped in position by a cover plate. This tool may also be used for various other purposes, such as finishing up certain

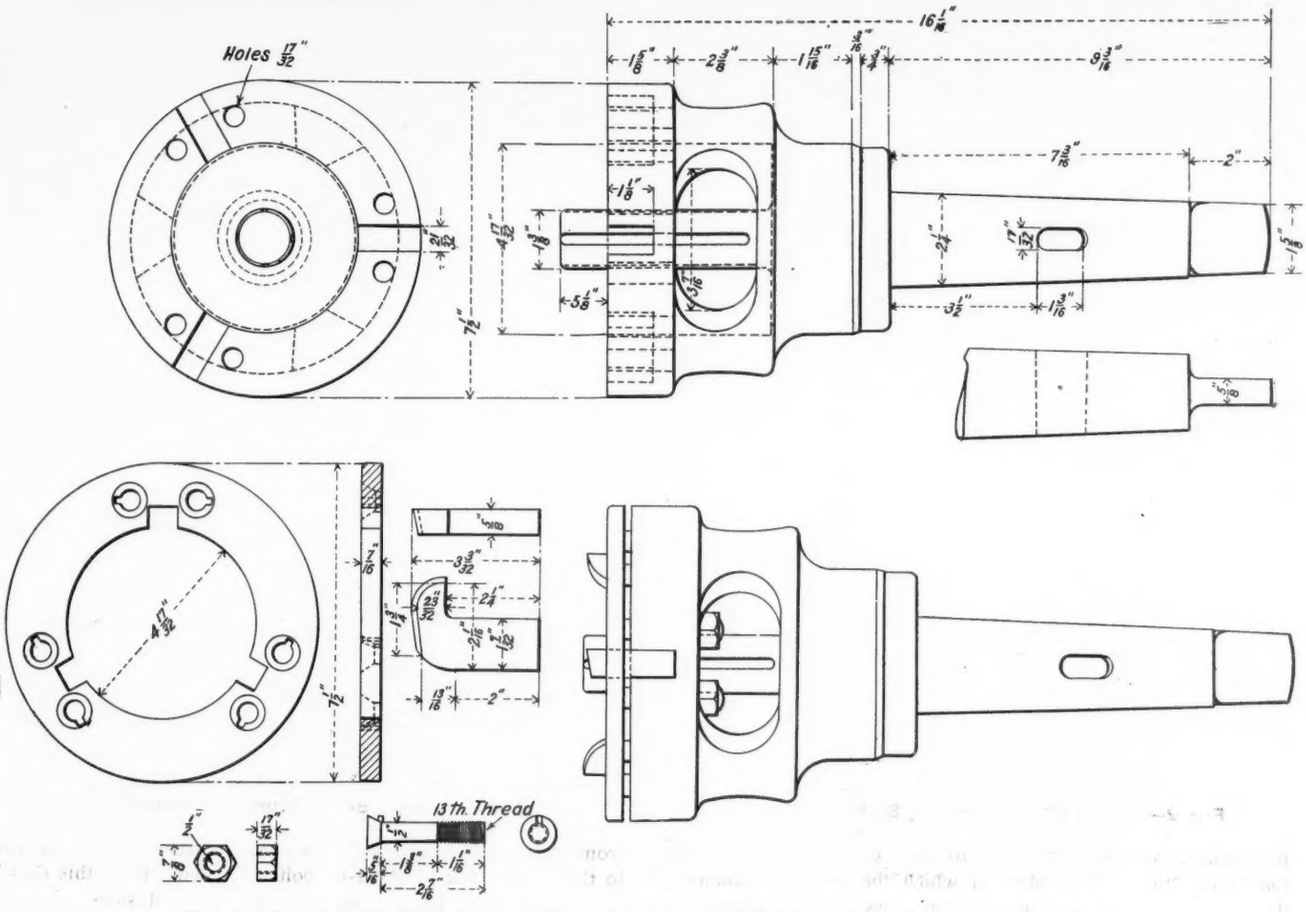


Fig. 6—Tool for Turning Ends of Rocker Arms and Outside of Solid Grease Cups on Rods.

classes of work on a horizontal boring mill. The old method of finishing rocker arms with a tool requiring four or five cuts is greatly improved by this arrangement, the same work being done in one half the time, as only two cuts are necessary for roughing and finishing.

RADIAL ATTACHMENT FOR MILLING LINKS.

A method of machining links on a milling machine is shown in Figs. 7 and 8. In this case the out-board center is fixed and the adjustments are made by the right and left threaded adjusting screw, operated by the 12-in. hand wheel. The adjustment is made more rigid by the arms extending out to each end of the table, clamped in the slots shown in Fig. 5. The table is made free to swing about the center by removing the transmission feed screw. With this device the entire width of the link face is milled to a finished surface in one cut.

IMPROVED LOCOMOTIVE DRIVING BOX.

An improved locomotive driving box is shown in Figs. 9, 10 and 11, the merits of which have been proved by practical use. Where it is used, the driving box, shoe and wedge can be removed from the locomotive without taking out or dropping the driving wheels, disturbing the brake rigging or taking down the frame binder. To remove the driving box from the locomotive, it is simply necessary to take the weight off the spring or equalizer, shift the saddle or equalizer to one side and lift out the key which holds the box in place, whereupon, since the box is unflanged at the outer end, it can be moved inward on the axle and taken out. Then the shoe and wedge may also be removed without disturbing the other parts.

The shoes and wedges are built out on the outside so as to take the lateral thrust and part of the wear of the driving wheel hub. The driving box, although having no outer flange, resists the lateral thrust of the driving wheel hub in the usual manner, transmitting the load through the previously mentioned key to the shoe and wedge. In the construction of this box

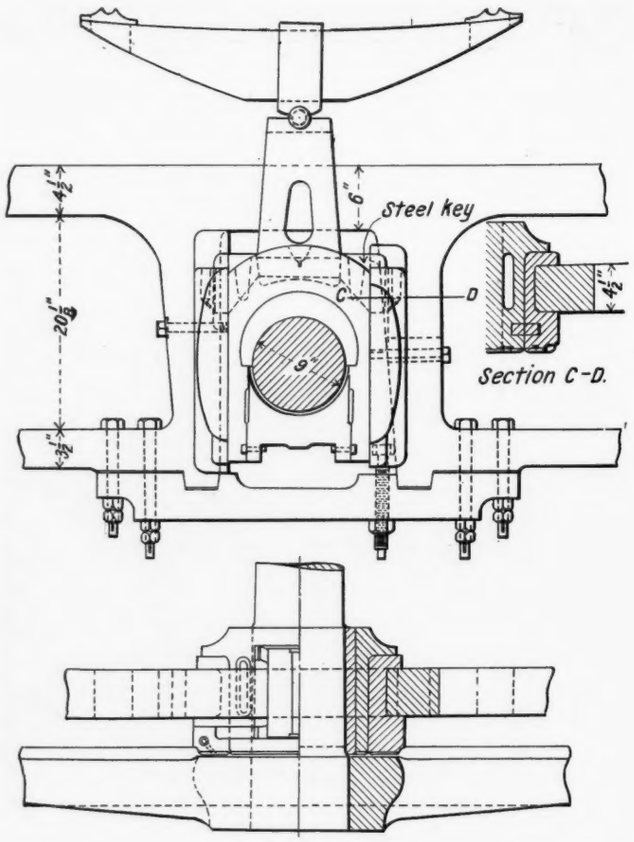


Fig. 9—Improved Locomotive Driving Box as Applied to a Locomotive.

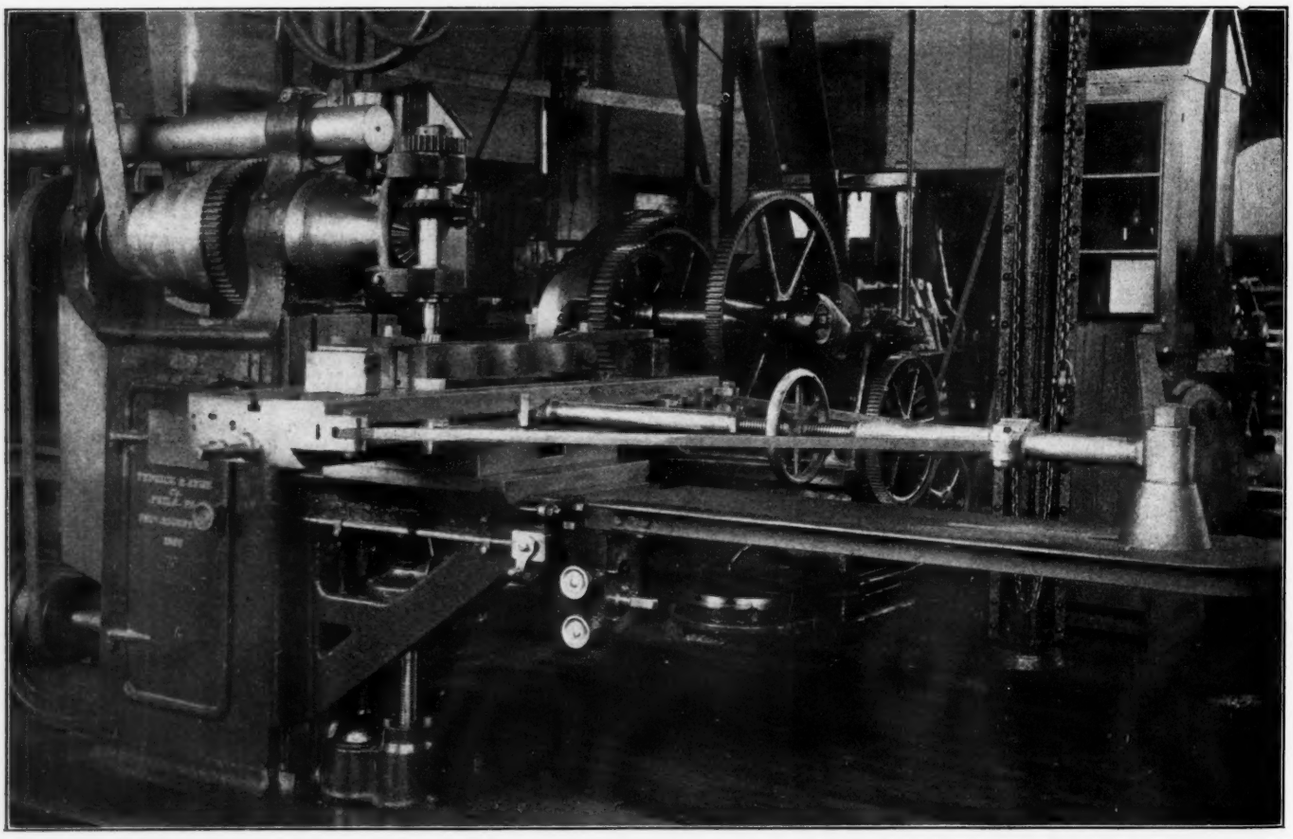


Fig. 8—Radius Attachment for Milling Machine.

the wearing surfaces on the sides of driving box have been increased nearly 50 per cent., and the shoe and wedge have been materially strengthened; it also permits of better lubrication. The

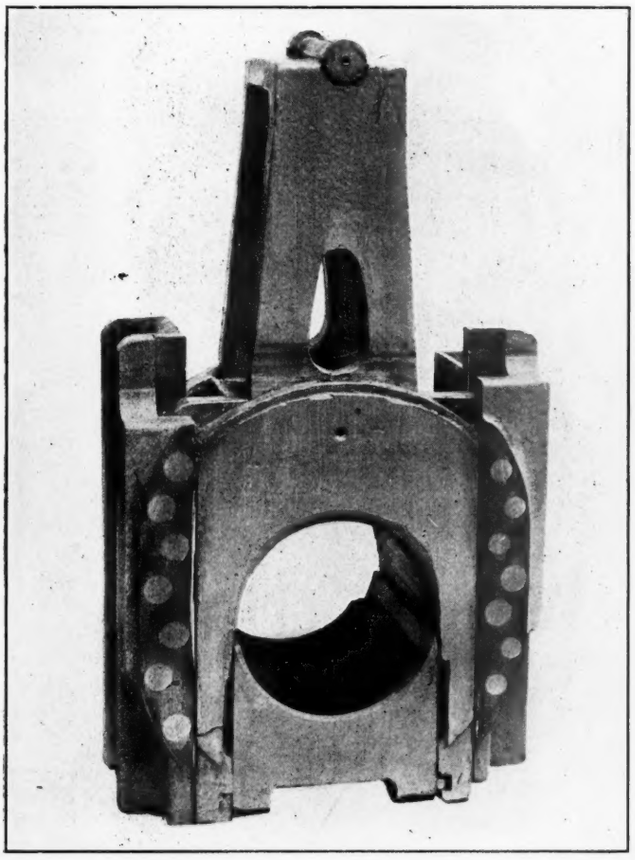


Fig. 10—Improved Locomotive Driving Box; Assembled.

wedges will not require adjustment as often as those ordinarily used, and frame failures will be materially reduced. A worn out, broken or loose journal brass, or driving box, can be taken out, repaired and replaced in a few hours without the use of a

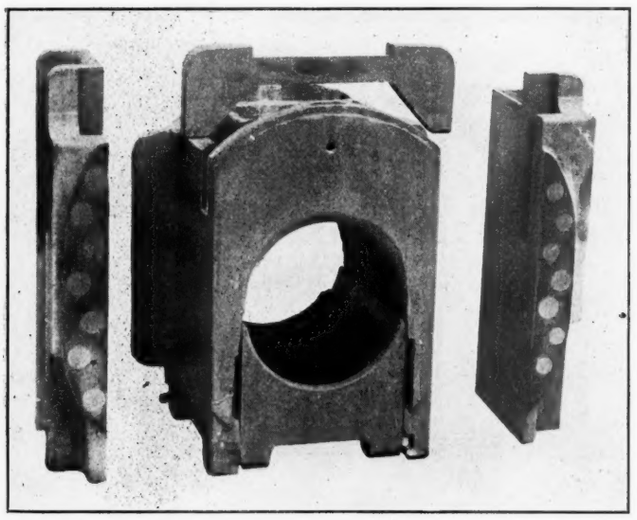


Fig. 11—Improved Locomotive Driving Box; Showing Its Construction.

drop pit or crane. The labor of taking down and setting up connecting rods, brake rigging, dropping wheels, etc., is saved and the locomotive is out of service only a few hours for such repairs.

This device is comparatively inexpensive to apply to locomotives going through shop. No new patterns are required; building out the old pattern for shoes and wedges and planing off the outside flange of the old driving box are the only changes necessary. This driving box construction is specially adapted for Mallets and locomotives with outside valve gear, and will greatly reduce the cost of running repairs and engine house expenses on any style of locomotive.

KEY SEATING MACHINE.

A machine for making keyways for eccentrics in driving axles is shown in Figs. 12 and 13. It is clamped to the axle

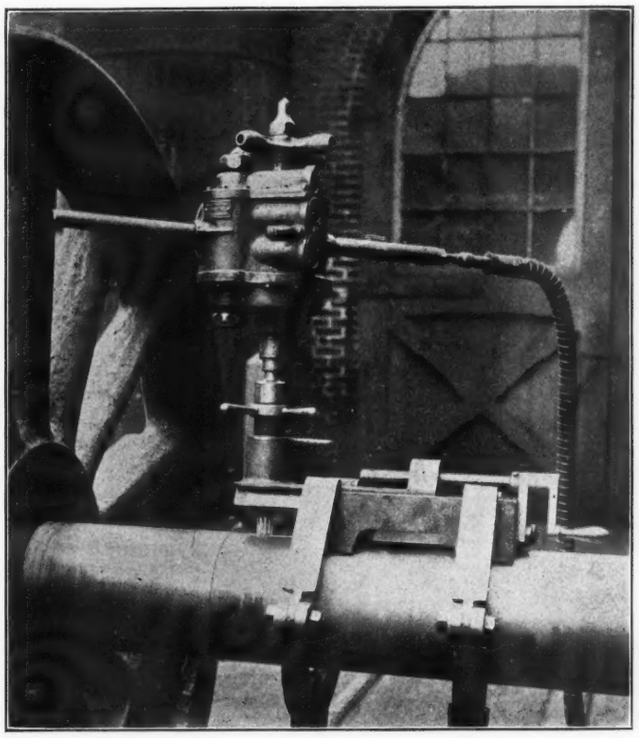


Fig. 12—Key-Way Cutting Machine.

by two forged steel jointed yokes as shown. The body of the machine is made V-shape to insure a good bearing on the axle. It contains a small carriage, operated by a lead screw, which

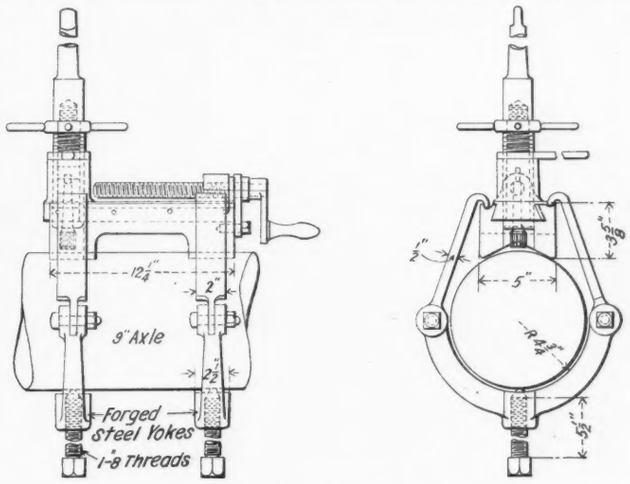


Fig. 13—Key Seat Cutter.

moves the cutter along the axle. The cutter is a small end milling tool driven by an air motor as shown in Fig. 12. With this machine better work is obtained, much time is saved and the valve man is saved considerable trouble.

ECCENTRIC MANDREL.

A mandrel for turning four eccentrics at a time is shown in Figs. 14 and 15. It is made of cast-iron 1½ in. thick, the inside being cored out to reduce the weight. Steel centers are inserted in the ends at a distance off-center to correspond to the required eccentricity, which in this case is 2½ in. for one set of centers and 2⅞ in. for the other set. These centers are provided to eliminate wear and to insure exactness. Suitable keys are provided for the eccentrics and they are clamped to the mandrel by tie keys. These mandrels have proved their reliability for turning up new cast steel eccentrics or trueing up old ones. They will stand the strain of heavy cuts and the mandrel shown will handle two different throw eccentrics.

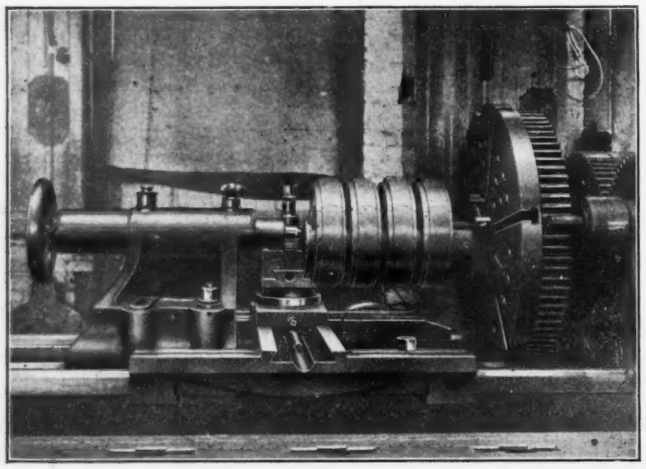


Fig. 14—Mandrel for Turning Eccentrics.

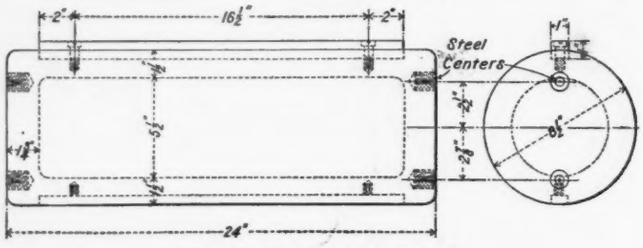


Fig. 15—Eccentric Mandrel.

TRUCK FOR MOUNTED DRIVING WHEELS.

A four wheel truck whose loading floor is only 4¾ in. above the floor is shown in Figs. 16 and 17. It is made of 3 in. x 1¼ in. bar-iron, with 10-in. forward wheels and 14 in. rear wheels. Its construction is clearly shown in Fig. 17, and its usefulness as a truck for heavy material is apparent. The side rails are 13½ in. apart, which allows a pair of mounted driving wheels to ride easily without danger of rolling off. Several of these trucks are in use in the Southern Pacific shops at Houston, Tex.

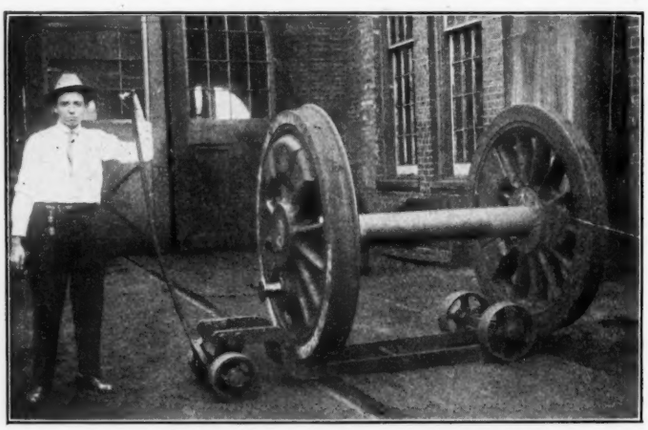


Fig. 16—Handy Truck for Driving Wheels.

ATTACHMENT FOR TURNING CROSSHEAD WRIST PINS.

A device for turning wrist pins on a four-bar crosshead is shown in Figs. 18 and 19. It is applied to the over-arm of a milling machine and clamped about the wrist pin. A gear is used on the spindle, in place of the milling cutter, which drives the split gear that holds the tools. Tools are placed on each face of the gear so that all the work on the wrist pin may be completed in one operation. The whole arrangement is split with the exception of the driving gear, and it is readily applied. The crosshead is clamped to the table of the milling machine and all the feeding is done by moving the work instead of the tool.

LATHE ATTACHMENT FOR TURNING REVERSE SHAFT.

A device for turning bearings on the ends of reverse shafts is shown in Figs. 20 and 21. A special lathe center, about 19 in. long, is required, which has a ½-in. keyway, as shown. The

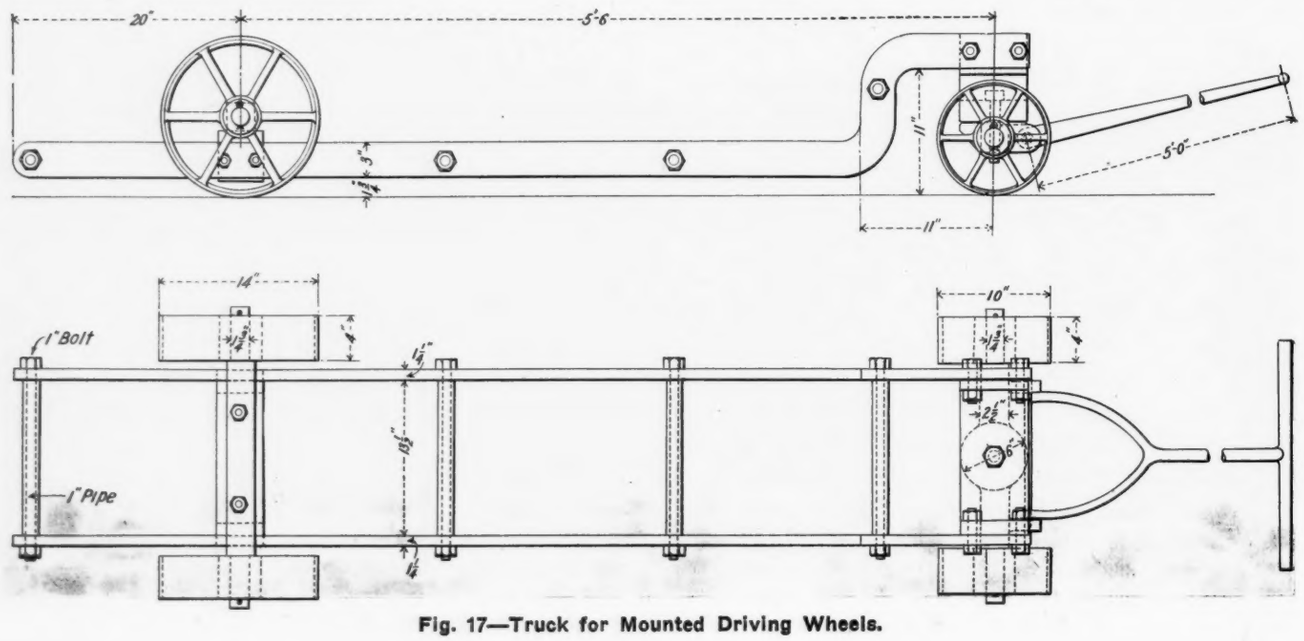


Fig. 17—Truck for Mounted Driving Wheels.

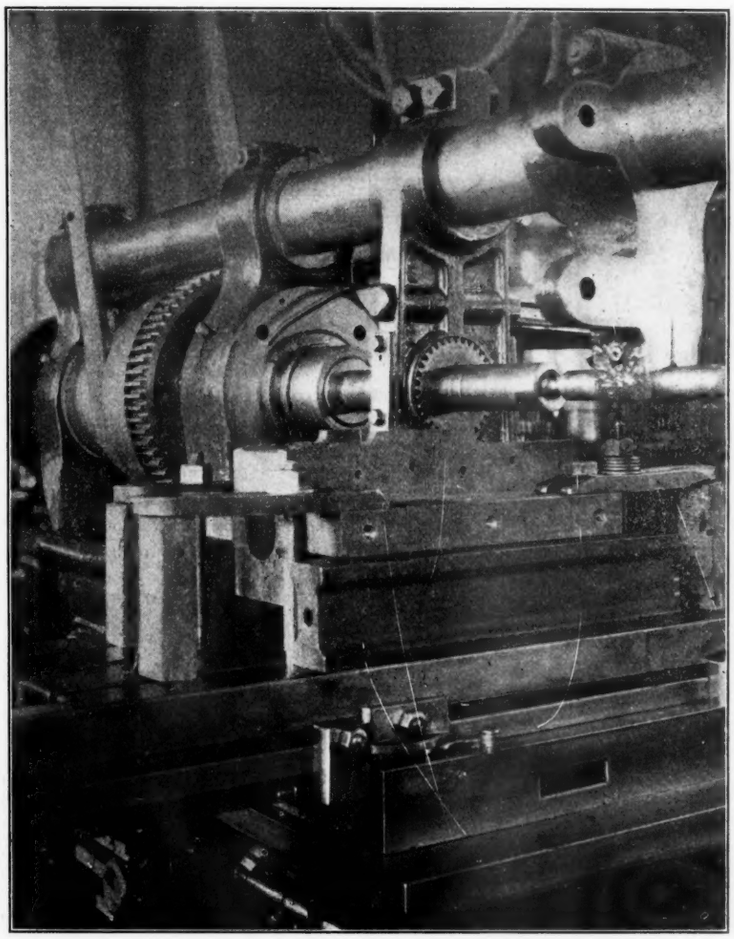


Fig. 18—Turning Wrist Pins on Crossheads.

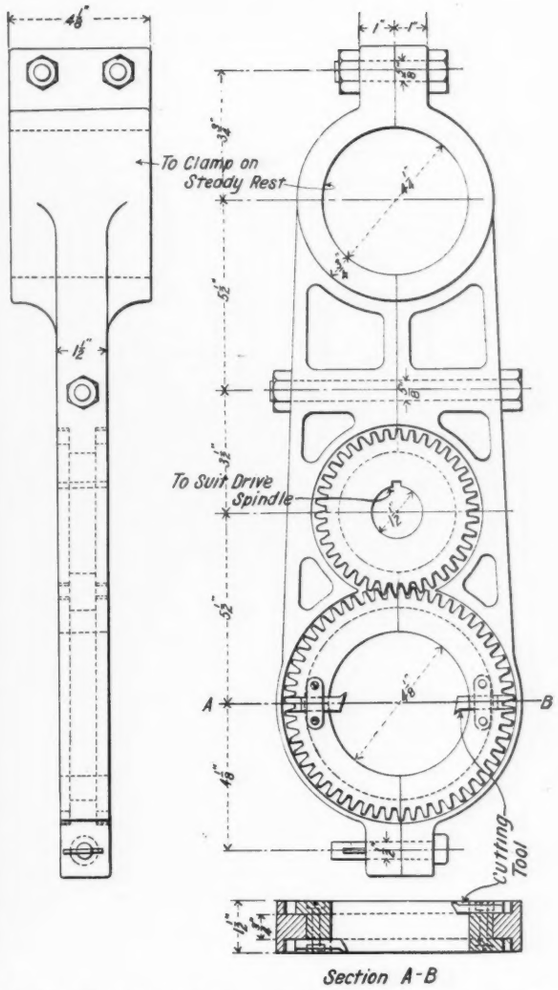


Fig. 19—Tool for Turning Wrist Pins on Crossheads.

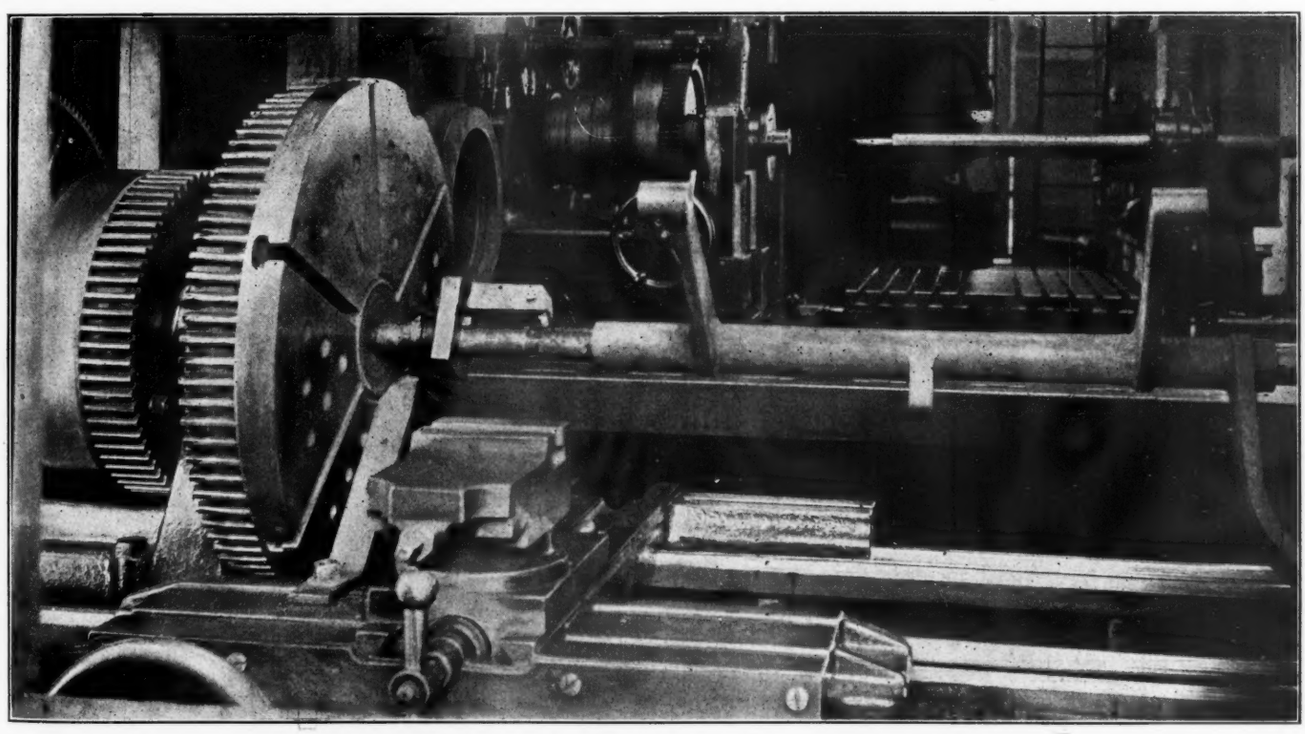


Fig. 20—Lathe Tool for Turning Reverse Shaft Bearings.

tool holder fits over this center and rotates with it, being driven by a key. This key is fast to the tool holder but free to slide in the lathe center, which allows the tool to be fed backward and forward on the lathe center. The tool is controlled from

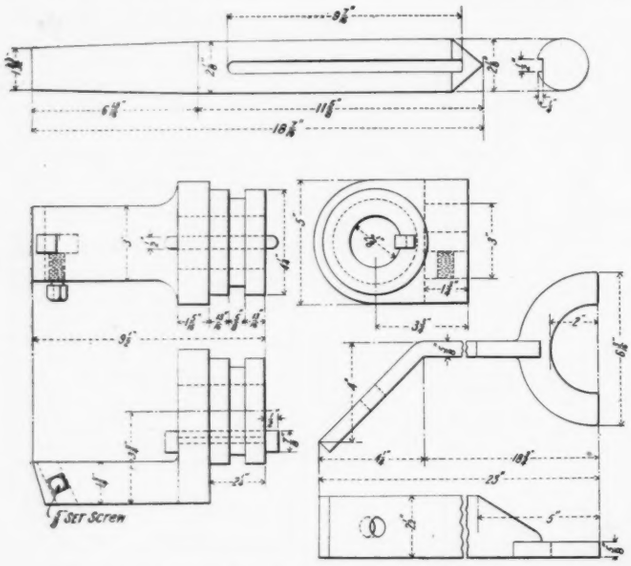


Fig. 21—Attachment for Turning Reverse Shaft Bearings.

the carriage by an arm on the end of which is a yoke fitting in a 5/8-in. slot in the holder.

REAMER FOR SIDE RODS.

A method of reaming holes for knuckle pins in side rods is shown in Figs. 22 and 23. The tool consists of a mandrel with a taper shank to fit a drill press and having an arbor 1¼ in. in diameter. With various sizes of shell reamers a combination may be formed, as shown in Fig. 22, to ream

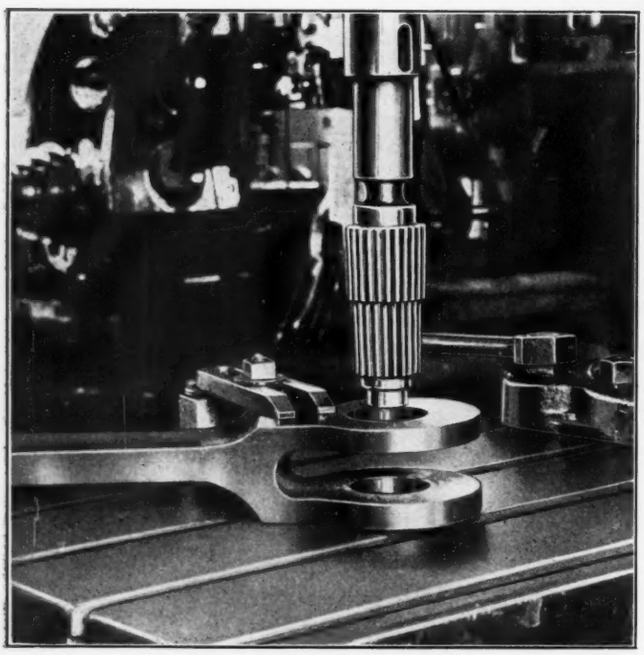


Fig. 22—Reamer for Side Rods.

out two different size holes, such as used for a knuckle-pin in a side rod, at the same time. The reamers are driven by a ¼-in. key and are held on the arbor by a washer and nut at the end.

WELDING LOCOMOTIVE FRAMES.

A successful weld being made by the Thermit welding process just back of the cylinder on the frame of an Atlantic type locomotive is shown in Fig. 24. This process has been successfully used for welding locomotive frames at the Houston,

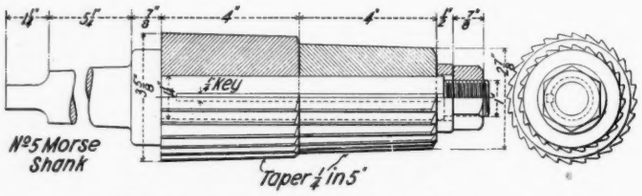


Fig. 23—Reamer for Knuckle Pin Holes.

Tex., engine house of the Texas & New Orleans for several years.

FIBER PLATE THRUST BEARING FOR DRIVING BOXES.

A fiber thrust bearing and its application to a locomotive driving box is shown in Figs. 25 and 26. The face of the driving box is counter bored 5/16 in. which, with a 5/8 in. fiber plate, allows for 5/16 in. wear. By its use the lateral play of the drivers may be taken up at any time without dropping the wheels. There are no bolts, nuts, clamps or other complicated parts to get loose, wear out, or require adjustment. When it becomes

Fig. 24—Making Thermit Weld on Locomotive Frame.

necessary to take up the lateral play in the driving boxes the work can be done by simply dropping the binders, shoes and wedges, and slipping the fiber plate in between the hub of driving wheel and the driving box. The counter bore in the box and the driving box cellar holds the plate securely in place. The amount of saving can be readily calculated by considering the length of time it usually takes to drop a pair of wheels. By this method the whole operation of taking up the play in a complete set of driving wheels on a ten-wheel locomotive only requires from five to seven hours. The work can be done on

branch lines where no drop pits are available, thereby eliminating the necessity of engines being sent to the shop for such repairs. This type of box and plate have been given a three year test on heavy passenger engines, and the results were satisfactory in every respect.

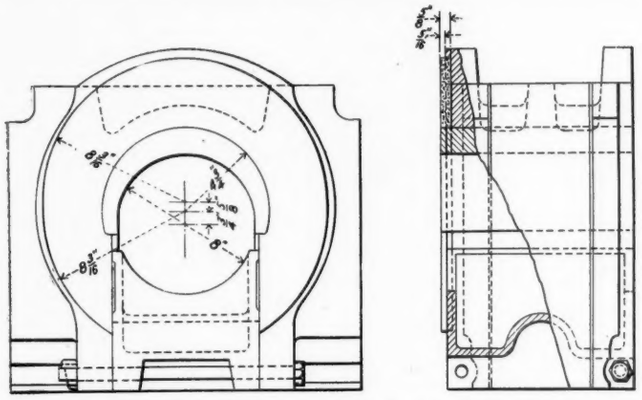


Fig. 25—Fiber Bearing Applied to Driving Box.

RATCHET LEVER.

The ratchet lever shown in Fig. 27 is simple in construction and its service will be appreciated by all machinists when working in a tight corner reaming or tapping out holes. The handle is made of a 1-in. iron rod upset at the ratchet end and shaped to 1¼ in. square. This end is cut away, as shown, to allow for the ratchet jaws. The ratchet wheel is 2½ in. diameter and the hole *D* is made to the required size. Various ratchet wheels may be made with different size holes to fit the different size taps and reamers. The steel spring holds the pawl in the ratchet wheel and by turning the lever over it can be made to work right or left handed. The effective pulling arm of the lever shown is 24¾ in., but the arm may be made as long as desired.

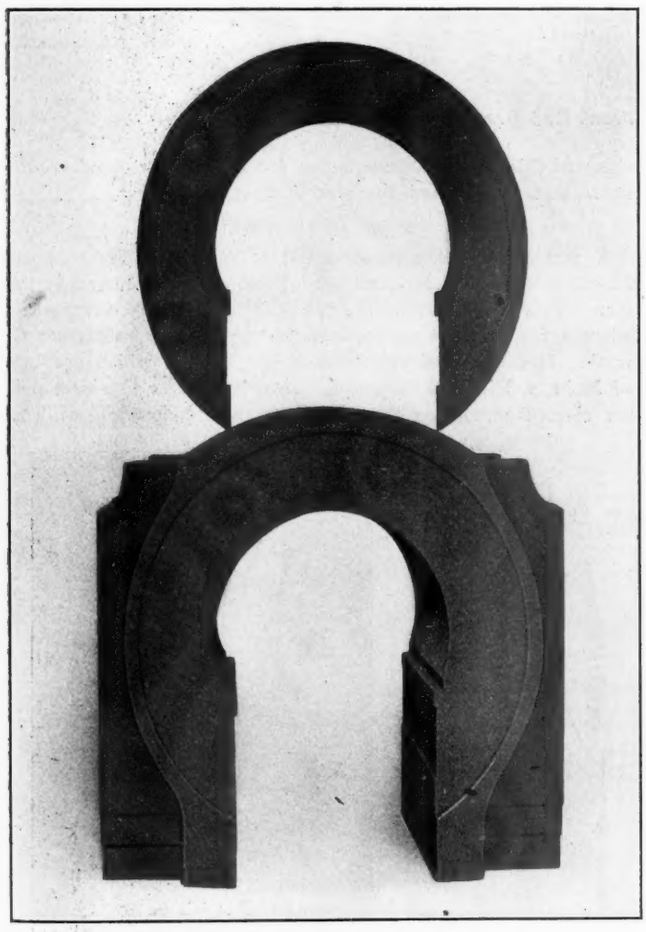


Fig. 26—Fiber Plate for Driving Boxes.

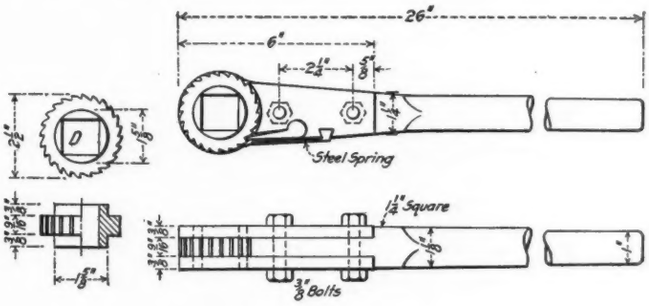


Fig. 27—Ratchet Lever.

RATCHET PIPE THREADER.

The ratchet pipe threader shown in Fig. 28 may be used to advantage in making repairs to pipe work on freight cars, oil tanks and any work where it is inconvenient to take the pipe from its place. Its construction is clearly shown in the illustration; it is made to turn in either direction by the double pawl which is held in contact by the ½-in. pin pressed out by a spring. The thickness of the whole arrangement is only 2¼ in. and the outside diameter is 3 in., making it possible to use it in close quarters. Dies of various pipe sizes may be made to fit the holder.

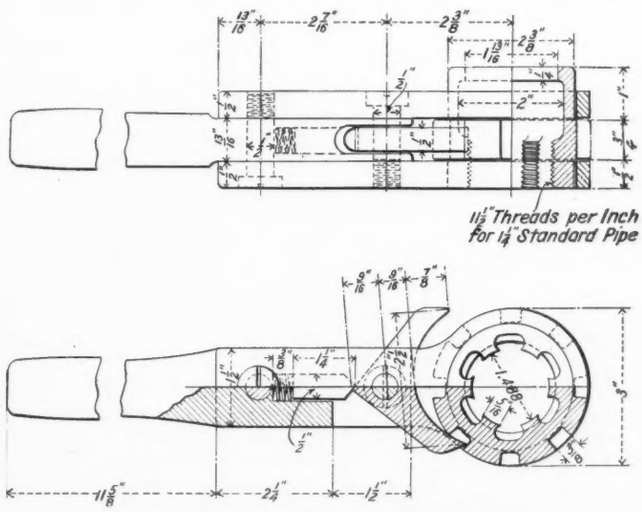


Fig. 28—Ratchet Die for Threading Pipes.

CRANE FOR LOCOMOTIVE FRONT END.

A convenient front end crane is shown in Figs. 29 and 30. It consists of a 6-in. I-beam, 10 ft. 4 in. long, supported at the smoke-box front ring by a Z-shape clamp, sliding on the top

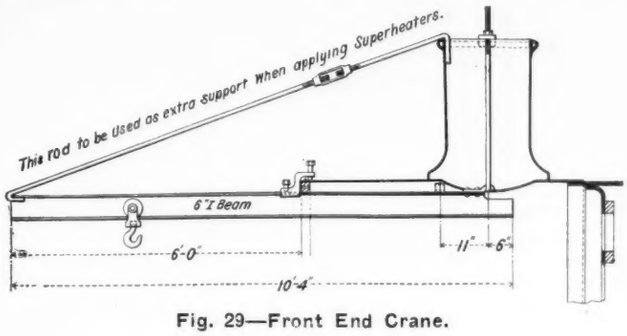


Fig. 29—Front End Crane.

flange of the I-beam and held to the ring by set screws, and at the stack by a rod extending down from a cross-piece at the top to the hook in the I-beam. When extra heavy work is to be handled, such as superheater headers, etc., a guy extending from the top of the stack to the outer end of the I-beam is used to take up the strain. A two-wheel trolley, provided with a hook, is used on the lower flange with which the material may be easily run in the smoke box. A complete set of detail sketches, shown in Fig. 30; clearly show its construction.

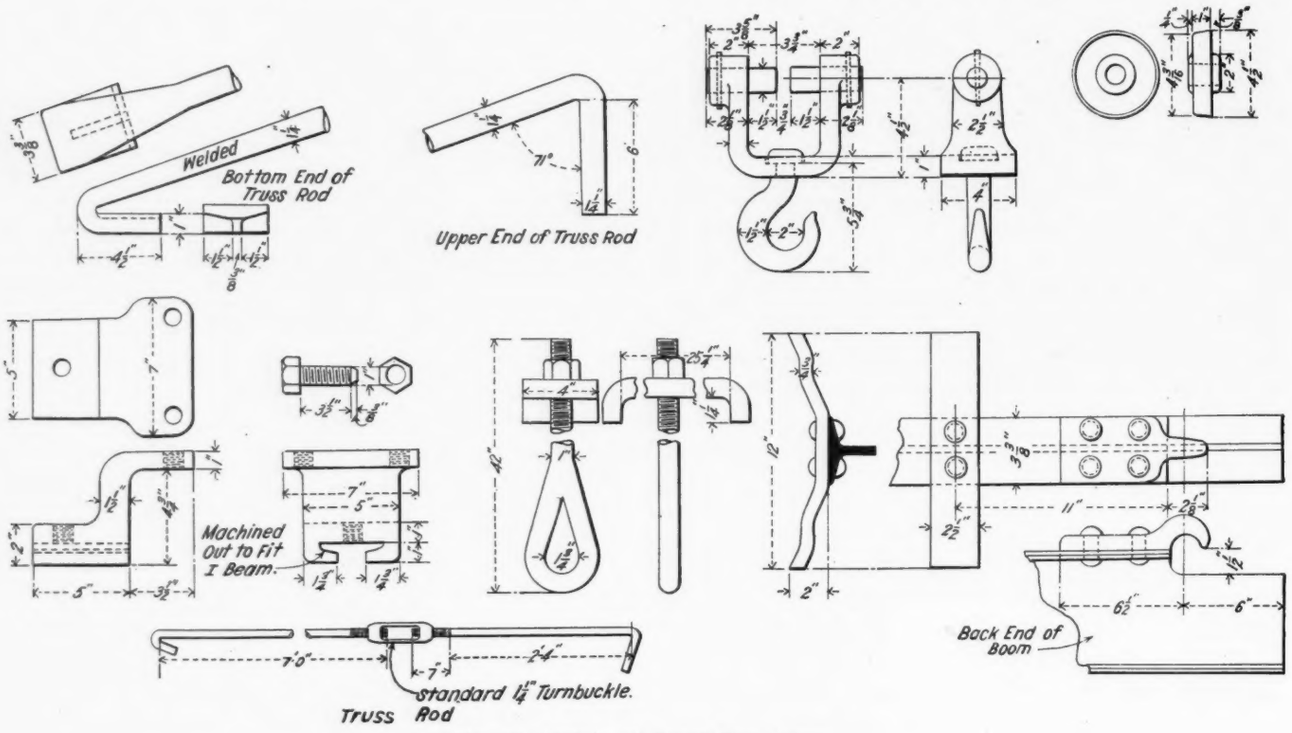


Fig. 30—Details of Front End Crane.

FLUE WELDING MACHINE.

A flue welding machine made of two long stroke pneumatic hammers is shown in Fig. 31. It is simple in construction and inexpensive, yet a practical and efficient welder. The upper dies work loose in guides and are lifted after each stroke of the hammer by ⅜ in. x 1 in. springs. One set of dies are made for 2-in. flues and the other for 2¼-in., both being separately operated by the foot levers shown. This machine can be used for both welding and swedging during the same heat. A machine of this kind has been in use for several years and records show that its maintenance cost is low.

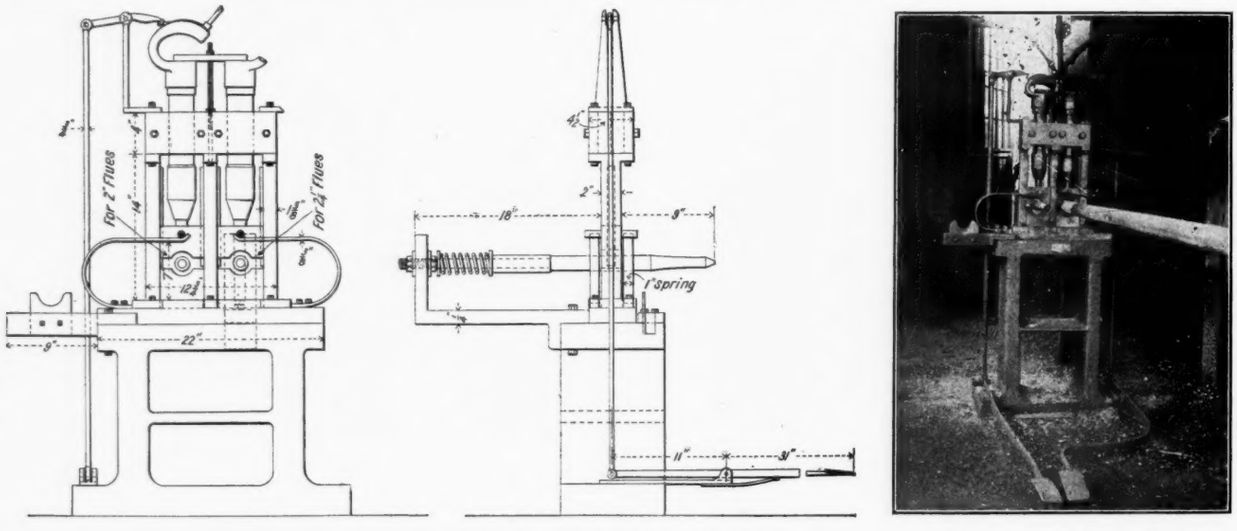


Fig. 31—Flue Welding Machine.

BOILER REPAIR STAND.

A servicable boiler repair stand is shown in Figs. 32 and 33. It is controlled by hand power, and can be operated by two men. This stand permits the boiler to be rolled to any position when a firebox is being applied, thereby greatly facilitating the work. It consists of two trestles, the legs of which are built of 30 in. x 3 in. x 3 in. angles. Iron bed plates 1¼ in. x 6 in. are riveted across the top. Between these plates and on each trestle are two cast iron rollers 1½ in. thick x 12 in. in diameter, which are held in place by pins 1½ in. in diameter. These steel pins are keyed to the hub of the rollers, the pins extending

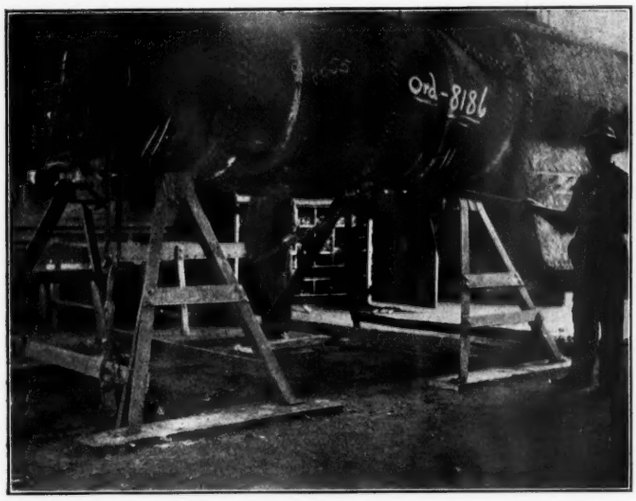


Fig. 32—Boiler Repair Stand.

out from the side of the bed plate several inches so a ratchet wrench can be applied for turning the boiler.

The outer edges of the rollers are notched to prevent slipping, and the top braces or bed plates have at least three holes drilled on each side of the center, so that the rollers may be adjusted to fit different classes of work. As will be noted in Fig. 33 a chain with 18 in. links, provided with 3 in. x 7 in. rollers at each joint, is swung over the front end of the boiler and fastened to the rails on the floor, which secures the boiler in its position. The trestle should be built high enough to allow the leg of the boiler to swing clear of the floor by about 12 in. It is only necessary to provide the ratchet attachment on the trestle just forward of the throat sheet, as two men can handle a large boiler with ease.

FLANGING CLAMP.

The flanging clamp shown in Figs. 34 and 35 consists of a cast steel bed plate 10⅝ in. thick x 8 in. wide; each end rests on an air cylinder placed below the floor. The piston rods work through 1⅞ in. holes in the bed plate, and are connected to the upper jaw or clamp. The upper portion of the piston

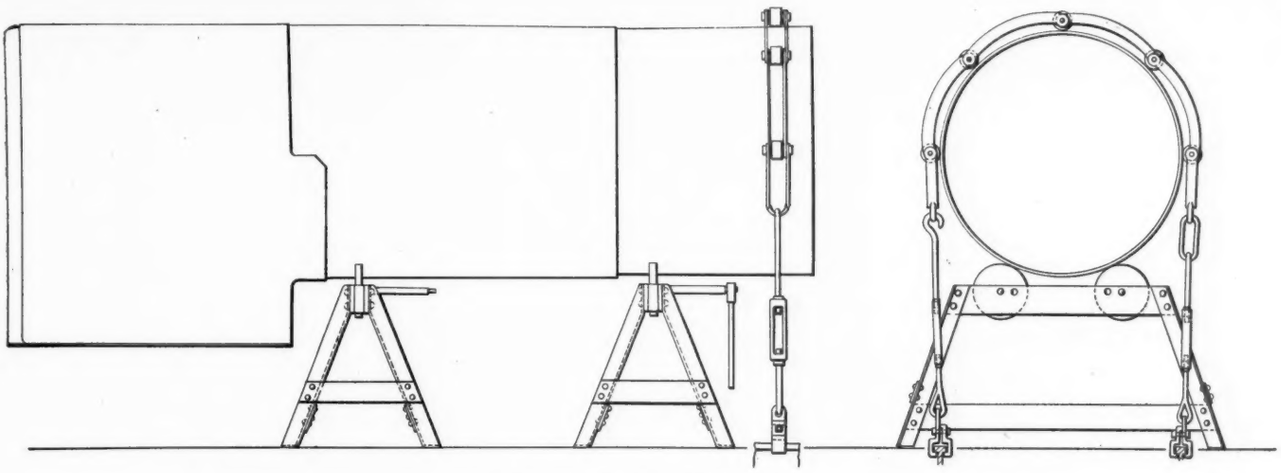


Fig. 33—Boiler Repair Stand.

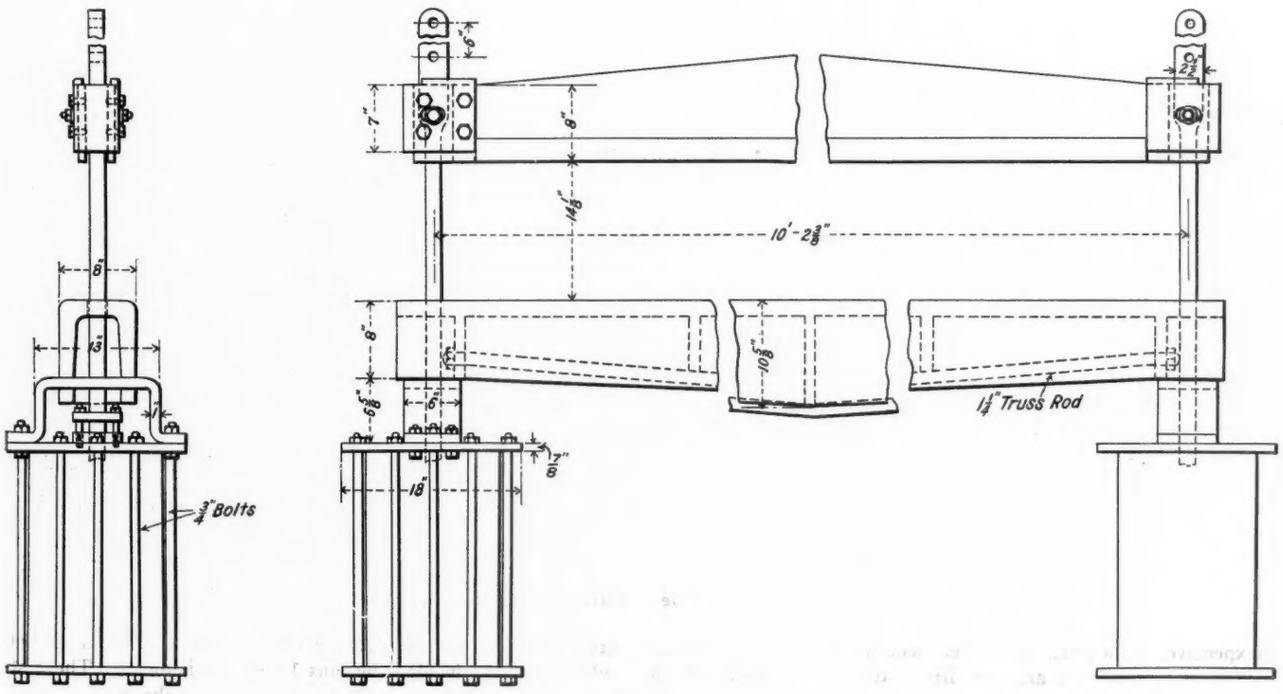


Fig. 34—Pneumatic Flanging Clamp.

rods are flattened and have three holes bored in them 6 in. apart to accommodate the pin which secures them to the moveable jaw. It will be readily seen from Fig. 34, that by changing the pins from one hole to another, the upper jaw can be adjusted to any desired height up to the piston rod limit. Air

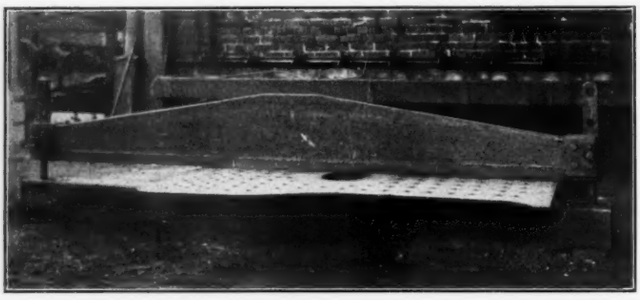


Fig. 35—Flanging Clamp.

pressure is admitted at will to either end of the cylinders through a three-way cock, thereby permitting the upper jaw of the clamp to be readily raised or lowered. This device should be located where the flanging fire and crane are provided for the handling of sheets and other heavy work.

RECLAIMING SCRAP MATERIAL.*

BY W. H. WOLFGANG.

This is an important item in the car department, which is sometimes gravely overlooked simply because all the material that is thrown on the scrap heap is termed worthless material. Take, for instance, a car that is wrecked on the road; nearly all of the material is placed with the scrap, although some of it may have been applied just before the car was wrecked. First of all there should be a platform between two tracks where all cars loaded with scrap can be easily unloaded and the good and bad material sorted out. The bad material should be put in bins or into cars—if the scrap is shipped often, the latter. This saves considerable room. The foreman should know to what series of cars the castings and forgings belong and should have the good scrap sorted out and properly distributed. There will probably be considerable scrap from foreign roads; this should be sorted and all the castings and forgings of the same class should be kept together. Another system of caring for the second hand material would be to have all castings and forgings that are in good shape sent to the storehouse and used as second-hand material. When an order is received for a certain casting or forging it can be supplied from this stock, making a considerable saving in a year.

Truss Rods.—Truss rods can be straightened and used over again if the threads are still good, or they can be shortened and used for shorter cars, or can be cut to different lengths and made into standard bolts.

Brake Levers.—Brake levers, if the holes are worn large, can have the holes plugged and new ones drilled; the lever will be as good as new.

Bolts.—Bolts that do not have rolled threads, if the threads are worn too badly, can be cut off and rethreaded. In cases where the head is broken or badly worn new heads can be forged on; this should be done on a 1½-in. forging machine which every shop should have. If many bolts are used that have rolled threads they can be cut off and a new thread rolled on; a great saving can be made if the shop is equipped with a thread-rolling machine.

Nuts.—A small two-story house about 12 ft. x 15 ft. should be built to sorts nuts in; the second floor should be level with the scrap platform so a man can haul a wheelbarrow into the house and dump the nuts into a chute which leads to the first floor and discharges on top of a table which should be about 30 in. wide by 6 ft. long and about 30 in. high. The space underneath should be divided into bins about 12 in. wide. The top of the table should have holes about 4 in. in diameter, with tin chutes leading to the bins. The chutes can be made to lead into kegs, or portable boxes, if desired, which can be taken to the nut tapping machines. The nuts after re-tapping will be as good as new and a great saving will result.

Axles.—Axles can be forged into different classes of parts, such as follower plates, etc. A large steam hammer is necessary of about 1500 lbs. capacity; also dies, headers and formers for the forging and bulldozer machines, and for tools for use under the steam hammer. These tools, of course, will have to be properly hardened. Equalizing bars for passenger cars can also be made. Steel tires can be forged and used in the same way as axles.

Cast Steel Body Bolsters.—The majority of bolsters that come to the scrap dock have been only partially broken, mostly near the center. If an oxy-acetylene outfit is available a good welder and an assistant should weld from 3 to 6 bolsters per day. The bolsters should be preheated in a furnace or with a blow torch. Although the reclaimed bolsters only have from 60 to 75 per cent. of their original strength they stand the service very well after being reapplied.

Arch Bars.—These can be forged into coupler carry irons and draft timber ties.

Follower Plates.—Most of the damaged follower plates are only bent or have the lugs broken off; they can be straightened under a steam hammer and new lugs can be welded on and are practically as good as new.

Knuckle Pins.—Some are only badly bent or have the heads broken off. The former can easily be straightened under a steam hammer, and the pins that have the heads broken off can have new heads forged on if they are long enough.

King Bolts and Center Pins.—These can be repaired in the same way as the knuckle pins.

Hand Brake Wheels.—Different kinds of brake wheels accumulate; they should be kept together in a separate bin for they can nearly always be used over again for repairs.

Grab Irons or Hand Holds.—These are mostly bent and can be straightened and will be as good as new.

Brake Connection Rods.—These are usually bent or broken and can easily be straightened and welded.

Brake Connection Pins.—All that are in good condition should be sorted into a bin and be used over again.

Springs.—Helical springs of different sizes can be kept together in a bin, if there are not too many, and can be used again. Those that are broken can be uncoiled and forged into cold chisels and punches, or other tools. The elliptical springs can be forged into S wrenches, chisels and different tools; they can also be reworked for brake beam springs on passenger cars.

Brake Beams.—These are usually bent or have the forks and heads broken. They should be taken to the smith shop and straightened or repaired and then stored in bins ready for use.

Coupler Yokes.—These should be sorted and those that can be used over again should be stored in a separate pile. Those that are broken should be taken apart and straightened and put in an iron rack.

Cross Tie Rods.—These are ½ in., ⅝ in., and ¾ in., should be taken to the smith shop at the end of the scrap platform, and have the broken or battered ends sheared off, straightened and put into the iron rack. They can be forged into bolts, brake hangers and grab irons.

Uncoupling Levers.—These are usually bent out of shape and can be straightened and rebent to the desired shape and used again.

Rail Spikes.—These can be straightened on an old anvil, dipped into crude oil, and used again.

*Submitted in the competition on this subject which elosed July 15, 1911.

Scrap Platform.—If the scrap platform is located far from the smith shop a shed should be built at the end of the platform containing an anvil, forge and small shear. The foreman of the platform should have all the material that is to be sheared and straightened placed near the shed and from there it can be distributed to the respective bins or iron rack. If the scrap platform is convenient to the smith shop, all bent material can be loaded on 4-wheel trucks and be taken to the smith shop and straightened under the steam hammer and then be placed in the iron rack.

Iron Rack.—There should be an iron rack located near the scrap platform and all iron that is in good shape and straightened should be put in it, so that when the smith wants a piece of second-hand material he will not have to sort over a whole pile of scrap to find what he wants. This saves the smith considerable time.

All the material, such as cast iron, wrought iron, steel, etc., that cannot be used again should be put in separate bins. From here it can be loaded in cars for shipment to the foundry to be melted over again.

RECLAIMING SCRAP MATERIAL.*

BY W. H. SNYDER,
Assistant General Foreman, New York, Susquehanna & Western, Stroudsburg, Pa.

There is an old saying that "a scrap pile is an engineer's grave yard," but if the proper care is exercised it will only claim such material as properly belongs to it. The system that has been in operation at our shop for some time is to have a committee which visits the scrap bins at least once a week and sorts out such material as can be used again. This committee makes a report of its findings to the general foreman.

Copper Steam Chest Joints.—In many shops the ¼in. copper wire used for steam chest joints is scrapped when an engine comes in for repairs, because it is flattened down. We anneal these joints and bend them edgeways, or at right angles to the former bend. This makes as good, if not a better joint then it was, when new. It requires about 5 lbs. of ¼ in. round copper wire to make a set of new joints. The old wire can be annealed and rebent for the same price that it would cost for making a new set.

Old Jacket Iron.—Old jacket iron that is not suitable for jacket use is cut to proper shape and used for tacking on pilots during the winter to prevent the snow from going through the pilot. This makes a saving over using thin boards or any other new material.

Scrap Lagging.—In the *Railway Age Gazette* of January 7, 1910, page 38, an asbestos grinder is shown, which is used very successfully for grinding old and broken section magnesia or asbestos boiler lagging into a pulp. This device may be very cheaply made, and is useful for grinding the scraps that are removed from a boiler. The cost of grinding sufficient old lagging to cover one engine is about $1.25. The cost of a new set of sectional lagging is about $50. A great saving can thus be affected by sweeping up all the scrap lagging, grinding it up and using it again. The ground asbestos is made into a mud, and the cost of application is the same as for a new set of lagging.

Damaged Steel Car Parts.—The handling of bent parts of steel cars is becoming an important matter in the car repair yard. We have a 4 ft. by 6 ft. forge located in the repair yard, which is equipped with a 4 in. blast pipe from the blacksmith shop fan. All bent parts are brought to this forge and straightened by two laborers. It is conveniently located and does away with carting the parts to the boiler shop.

Bolts, Nuts and Washers.—The laborer that sweeps the shop gathers up all the old bolts, nuts, washers, etc., and trucks them to a small building where they are sorted out. Old bolts suitable for service are straightened and when necessary are cut to a proper length and rethreaded. These are only a few of the numerous ways we have of reclaiming scrap material.

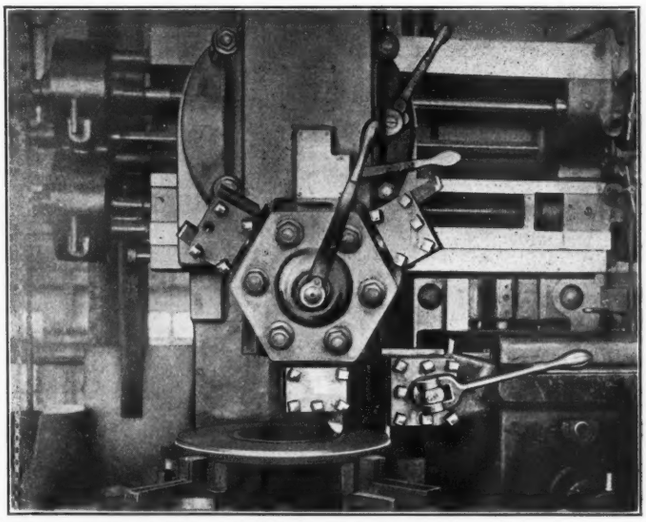
*Entered in a competition on this subject which closed July 15, 1911.

MACHINING HUB PLATES.

BY C. E. PATRICK.

A method of machining hub plates on a Bullard vertical turret lathe is shown in the accompanying illustration. With this machine all sizes of hub plates may be machined with the two tool heads, where on the boring mill only the larger sizes can be finished. Three tools are used in the vertical turret head, namely: a roughing tool, a finishing tool and a boring tool, while in the side turret a ⅜-in. parting tool is used. In this way both vertical and side turret may be used at the same time.

To machine the hub plate as shown, proceed as follows: Start a cut with the roughing tool facing the top of the hub plate; as soon as it has fed in about 1½ in., the ⅜-in. parting tool in the side head can be set to turn the outside to its proper diameter, using the fine feed. During the time this tool



Machining Hub Plates on a Vertical Turret Lathe.

is feeding down to the chuck, the top can be faced and the hole bored, after which the side turret may be turned half over to bevel the corner. The top is then finished with a finishing tool, thus completing one side of the hub plate. The plate is then turned over and a roughing finishing cut is taken on the other side. The boring tool is replaced by a tool to make a fillet on this side and with this operation the hub plate is completed.

When making several plates of one size the observation stops on the different feeds are of great value, for they readily show the limits to which the different feeds are to run. In the case where many plates are made from one block, the parting tool must not be allowed to cut through the block until the top face has been finished. It has been found advisable to keep the tools in good condition, especially the parting tool, as better work can be done, and in a shorter time.

According to the eighth semi-annual report of the South Manchuria Railway, covering the period ended September 30, 1910, the greatest increase in expenditure was for railway construction, the amount spent for that purpose being $3,434,870. It is probable that this sum was used chiefly on the Antung-Mukden line, where there is a stretch of about 60 miles still to be converted to broad gage, and in the construction of shops at Shahokou. When these shops are completed the company will be able to supply most of its own needs, even to locomotives.

MASTER BLACKSMITHS' ASSOCIATION

The nineteenth annual convention of the International Railroad Master Blacksmiths' Association met at the Boody House, Toledo, Ohio, July 15-17, John J. Connors, A. & W. P., Montgomery, Ala., presiding. Rev. Kinnane opened the meeting with prayer and an address in which he emphasized the necessity of striving toward high ideals. The mayor, Hon. Brand Whitlock, welcomed the convention to the city. B. A. Worthington, receiver and general manager of the Wheeling & Lake Erie, gave a most interesting address, in which he spoke in a witty manner of the development of the art of blacksmithing, and also touched on the problems of government regulation of railways and improved efficiency. Following the presidential address by J. J. Connors the meeting adjourned until the afternoon. The report of the secretary-treasurer, A. L. Woodworth, master blacksmith, C. H. & D., Lima, Ohio, showed an active membership of 277, associate members 27, and honorary members 10, making a total membership of 314. There is a balance of $565.96 in the treasury.

TOOLS AND FORMERS.

G. M. Stewart of the Pennsylvania Railroad, Altoona, Pa., presented a paper on this subject as follows: We have learned a great deal concerning the design of dies from the methods of those who use the cold forging process. We find that material will go so far at one operation without bending or doubling back, and to secure good results it should never be pressed beyond that point, as for instance in the making of ladder treads. The accompanying illustrations show the five operations which we use in making these treads. Three of these operations are

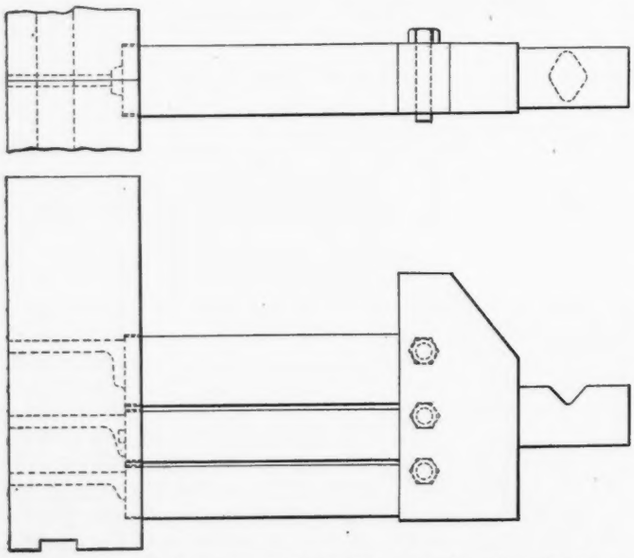


Fig 1—General Arrangement of Dies for Forging Ends on Handholds and Ladder Treads.

for forming the foot of the tread in a forging machine from 4¼ in. of ⅝ in. round stock. The general arrangement of the dies is shown in Fig. 1 and the details in Fig. 2. The first operation is to form the end of the rod as shown at *A*, Fig. 2, the material being rushed back just as far as it will go without bending, or rather doubling back at the end. In the second operation it is formed to the shape *B*, Fig. 2. The shape at the end of this operation is just a trifle smaller than at the end of the third operation. The die used for the third operation is the exact shape of the foot, and the plunger has a pin in the center which penetrates the foot within 1/16 in. of passing through the 9/16 in. stock. The foot is then taken to an emery wheel and ground, making a very neat forging.

The two bends at each end are made in an air operated bending machine, the first bend being made by the dies shown in Fig. 3. The final operation of bending is made on the bending machine with the dies shown on Fig. 4. The dies for bending the two types of handholds which are used are quite similar,

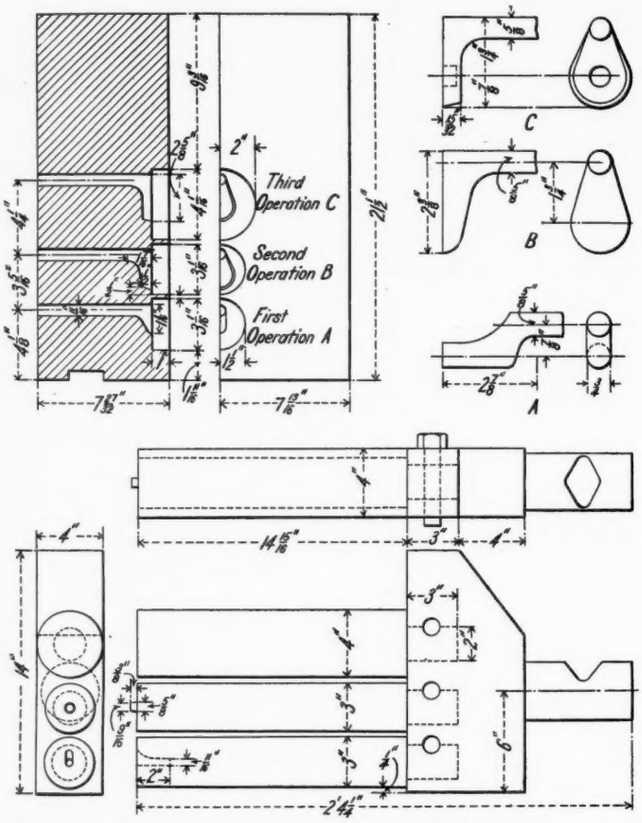


Fig. 2—Details of Dies and Formers for Forging Ends on Ladder Treads.

as indicated on the drawing. The upsetting dies were forged from scrap steel, a set weighing about 200 lbs. when completed. Very little machining is required. We have turned out more than 5,000 upsets on one set without dressing. The dies for bending are made in the same manner and of the same material,

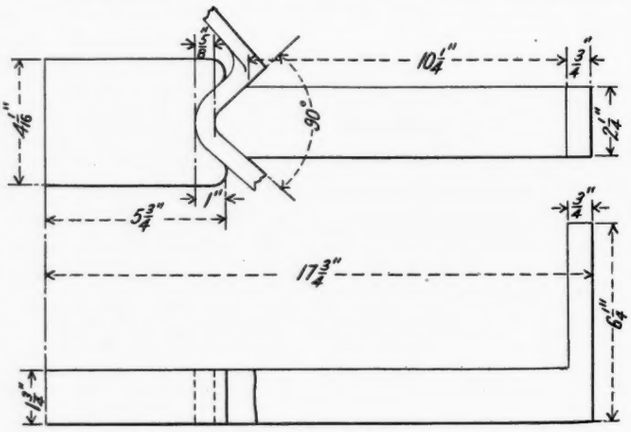


Fig. 3—Device for Bending Ends of Ladder Treads.

weighing about 60 lbs. per set and requiring very little machining.

Discussion.—In an informal discussion of these dies, which took place while some of the members were looking over the

blueprint, after the meeting, it was suggested that the foot of the handhold could be formed by two upsetting operations instead of three, by making the first operation one of offsetting, rather than of offsetting and upsetting.

F. F. Hoeffle (L. & N., South Louisville, Ky.):—Success in this work depends largely on being able to design your own tools. Such knowledge is acquired only by years of close observation and experience. Great care and judgment should be used to avoid as far as possible having light and heavy sections in the same casting, as this will cause unequal shrinkage, throwing a strain on the lighter parts, and causing them to break when given a sudden jar. Cast and forged steel make the best dies for strength. I have had most excellent results with grey iron dies. The following chemical analysis of iron for hammer dies and forging machine dies and formers of all descriptions, ranging in weight from 500 lbs. to 5,000 lbs., to a great extent eliminates the fire cracks in that portion of the dies subjected to the intense heat. It was suggested by M. Dolan, general foundryman foreman, Louisville & Nashville:

Silicon	.80 to 1.25	Manganese	1.25 to 2.25
Sulphur	.06 to .10	Combined Carbon	.75 to 1.00
Phosphorus	.30 to .50	Graphitic Carbon.	2.25 to 2.75

For lighter dies and formers weighing less than 500 lbs. the silicon should be increased to 1.50 or 2.00.

With grey iron dies for the forging machine, I have found it to be the better plan to have all die sinking done by the pattern maker; such dies are good enough for any article that is to be made in a railway shop. The steel dies should range from .50 to .60 carbon, and the die sinking should be done in the machine shop, especially when the articles are for commercial hardware purposes. It has been found that when parts of the grey iron dies become worn, inserts of steel of about .40 carbon can be used to splendid advantage. Inserts made from high speed steel have been tried out and have failed to stand up, as they are damaged by the water. Fire cracks occur and the dies will not do good work under such conditions.

G. A. Hartline (L. S. & M. S., Collinwood, Ohio) also presented a paper on tools and formers of which the following is an abstract: We make the dies for our forging machines of scrap driving axle steel, especially where a large number of forgings are required. We have dies of this material which have made thousands of forgings and are still in good condition. If only a limited number of forgings are to be made, cast iron will answer, but we have had trouble due to the breakage of such dies under the tremendous pressures which are required. Steel gives the best service in the long run.

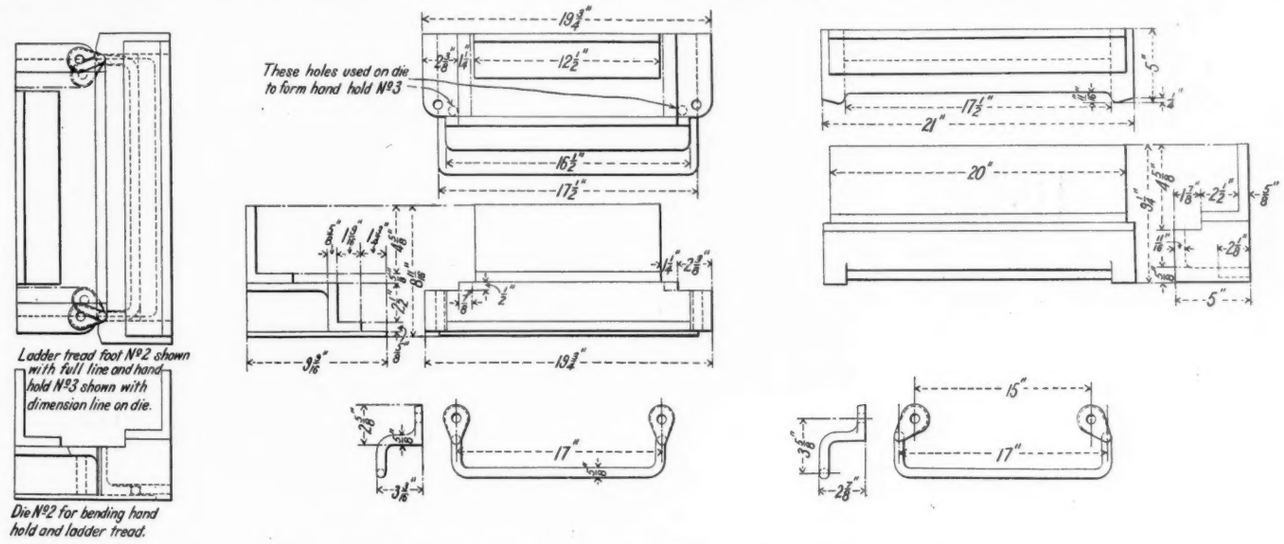


Fig. 4—Dies for Final Bending of Handholds and Ladder Treads.

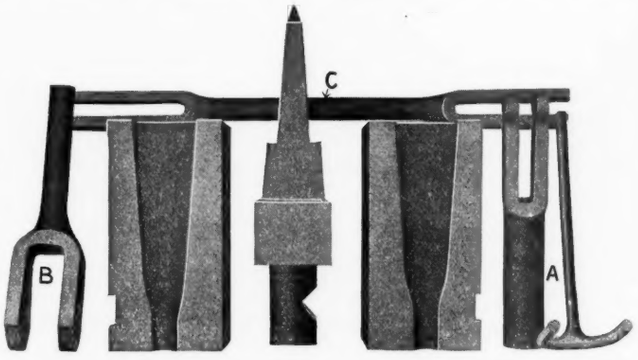


Fig. 5—Typical Dies and Former for Butt-Welding, With Examples of Such Work.

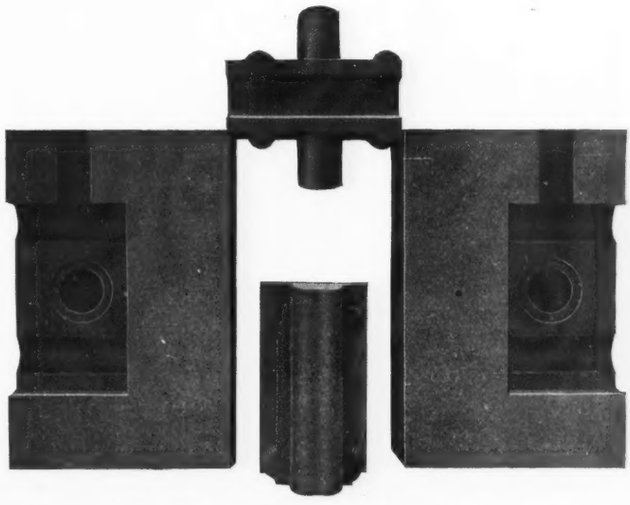


Fig. 6—Dies and Former for Radius Bar Lifting Blocks.

We butt-weld a number of forgings in our forging machines, such as slack adjusting rod forks, bottom connections, swing hangers for freight and passenger cars, and clinker hooks. The stock for the forked ends of these parts is sheared on a bulldozer and bent to a U shape. The two pieces are heated to a welding heat and butted together, after which they are placed in the forging machine with a small jet of compressed air playing on the parts which are to be welded. This not only keeps the metal welding hot, but blows out any dirt or scale which

might accumulate at this point. The plunger has a pointed end, as shown in Fig. 5, which forces itself through the fork into the round stock, thus intermingling the grain of the material and insuring a solid weld.

These bars have given splendid results when tested for tensile

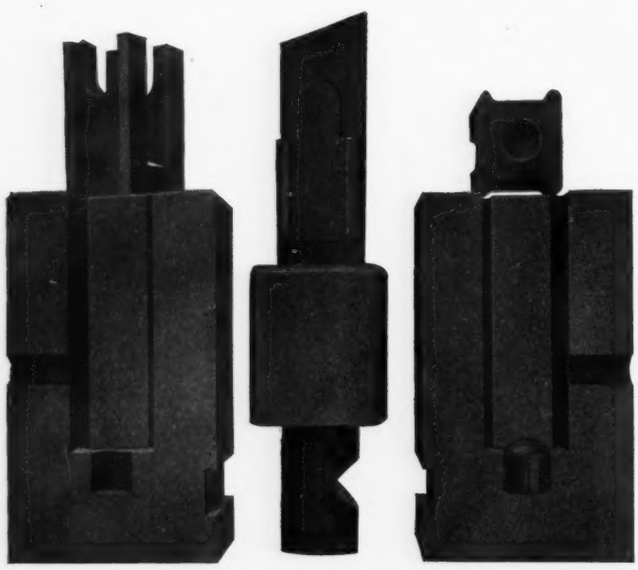


Fig. 7—Dies and Former for Slack Adjusting Rod Blocks.

strength. For instance a bottom connection rod for passenger cars (*A*, Fig. 5), consisting of a 2½ in. x ¾ in. bar iron fork butt-welded to a piece of 2¾ in. double extra wrought iron pipe in dies similar to those shown in the illustration, broke in the weld under a pull of 151,200 lbs. A slack adjusting rod fork (*B*, Fig. 5) made of a U of 2½ in. x 1 in. bar iron butt-welded

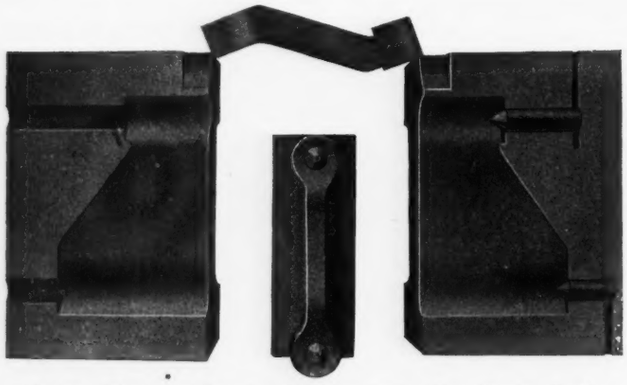


Fig. 8—Dies and Former for Passenger Car Truck Brake Hangers.

to 1¾ in. round iron broke in the weld under a stress of 106,000 lbs. A bottom connection rod for freight cars (*C*, Fig. 5) made from a U of 2½ in. x ¾ in. bar iron butt welded to 1¾ in. round stock broke in the weld under a pull of 74,000 lbs. We made about 12,000 of these connections last year.

Dies and formers for making several intricate parts in forging machines are shown in Figs. 6, 7 and 8. Those in Fig. 6 are for making radius bar lifting blocks used with Walschaert valve gears. Those in Fig. 7 are for making slack adjusting rod blocks, and those shown in Fig. 8 are for making brake hangers for passenger cars.

Dies for bending either round or square coupler pockets on a bulldozer are shown in Fig. 9. These dies can quickly be adjusted to suit any width or thickness of iron by loosening the set screws. The rollers at the ends are fastened to adjustable plates and are closed to the desired width. By loosening a set screw the plunger used for forming the round end yoke can be replaced by one for bending square ends. Of course the blocks against which the plunger works would also have to be changed. These changes may be made while the iron is heating in the furnace. The plunger for bending the square back pockets has a locking device on the end that works in a dove-tail groove on the bottom of the plunger. It is closed and locked by an eccentric which is operated by a small lever. The blank is placed

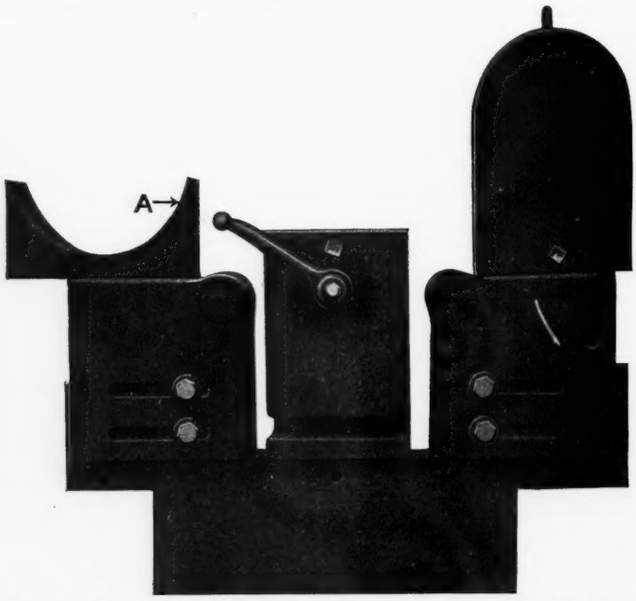


Fig. 9—Adjustable Dies for Bending Round and Square End Coupler Pockets.

between the jaws, and by operating the lever is held in a vise-like grip until released by the operator. The filler block *A* is used for bending the round end pockets.

A great deal depends on the skill of the operator and the heating capacity of the furnaces in the successful making of forgings. A study should be made to complete each article with the least number of operations and with a minimum amount of handling.

D. M. Dulin (N. & W., Portsmouth, Ohio):—An ingenious device for forming a Wagner door mast hook in one operation is shown in Fig. 10. The dotted lines show the initial position

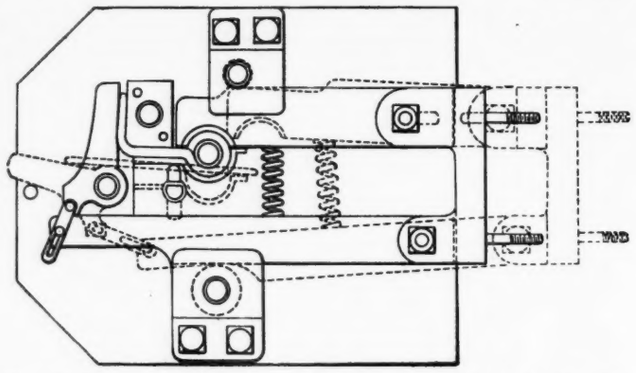


Fig. 10—Dies for Forming a Wagner Door Mast Hook on a Bulldozer in One Operation.

of the stock and the parts of the apparatus. The full lines show the finished shape of the material and the positions of the various parts of the device.

Discussion.—In commenting on the value of dies and formers used with the forging machine or steam hammer, H. L. Weitzel compared the anvil to the stage coach and the modern methods of forging to an observation parlor car.

DROP FORGING.

H. E. Gamble (P. R. R., Altoona, Pa.) :—The dies should be made by men who are familiar with this class of work to produce the desired results, and the hammer should be of sufficient capacity for the work required of it. Some say that the rod breaks in the drop forge shops are too numerous. It may be true, but I believe that these breaks occur from over-taxing the hammer and from poor material in the rods. The drop-hammer cannot stand forever without some breaks caused by poor heating and the hammers not being heavy enough to produce the work put under them.

Care and judgment should be exercised by the foreman and the die-maker in using the proper amount of material to produce the forging, so that the dies will not be overcrowded with surplus material. This will keep down the cost of the article and reduce die repairs. Plenty of work, good experienced men, and up-to-date hammers and furnaces are necessary for the best results. We have in the Juniata smith shop of the Pennsylvania

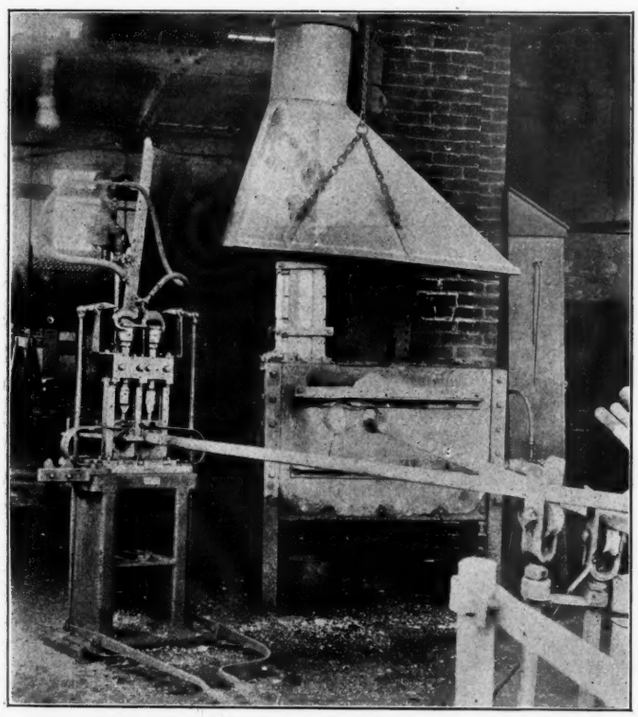


Fig. 11—Machine for Welding Safe Ends on Tubes.

Railroad one 6,000-lb., one 3,000-lb., and two 1,500-lb. drop-hammers, and they produce work ranging in weight from one-half ounce to 90 lbs., including locomotive and car parts.

Jas. T. McSweeney (B. & O., Baltimore, Md.) :—There are a great many forgings that can be made on a drop hammer, that cannot be made on a forging machine. Very few railways have drop hammers, but it seems to me that if the commercial concerns can make money by selling drop forgings, the railways could save money by making their own drop forgings. We are trying to use one of our steam hammers to make such forgings, but it is not a success on account of the lower die being separate from the housing of the steam hammer, making it a hard matter to keep the top and bottom dies straight. Drop forgings save greatly in machine work, as the forging can be made so close that it needs no further work after coming from the hammer.

Discussion.—The grade of steel to be used for the dies depends entirely on the class of work which is to be done. The dies may sometimes be hardened to advantage, but only on the surface, and on that part of the surface which is subjected to wear.

FLUE WELDING.

C. A. Sensenback (P. R. R., Sunburg, Pa.) :—We use but one man on welding flues, and his output will average thirty to thirty-five flues per hour. The various operations performed by him and considered as a part of the welding process are: Heat flue, bell out flue, put safe end in flue, weld flue, swaging.

J. Geo. Jordan (T. & N. O., Houston, Tex.) :—The tools for the different operations should be close together. At our plant we have a shed roof connected to the boiler shop under which all the flue work is done. The flue rattler is muffled to deaden the noise. We put the flues in the rattler with a few pieces of old angle iron, and some old washers and nuts; it takes about three hours to get them clean. From there they go to the cutting off machine, which has two rollers at the bottom and a roller knife at the top, similar to a tool for cutting off pipe. The next operation is to scarf them; this is done in a machine that has three cutters set in a head. There is a foot lever which feeds the flues in when it is pressed down; when scarfed they are piled near the flue welder. The safe ends are scarfed on the same machine by taking off the head and putting on a tapered reamer in its place.

The next operation is to weld them, for which we have an air hammer of our own make; it is made from two very large air hammers that the bridge department had been using on bridge work. They were put in a frame as shown in Fig. 11, and the die is so constructed that when the flue is down to size, it will meet and cannot hurt the flue. The bottom die is stationary and the top one is held against the hammer. All the flue welder has to do is to turn the flue. We average 400 flues daily, the flue welder having one helper. We use oil for fuel, and the furnace is of our own make. It has two holes for heating, and will heat one flue per minute. I believe in scarfing the flues, as you get a clean weld with no scale between your scarf. We use steel safe ends; they weld about as well as iron. We test all our flues with water pressure before putting them in the boiler.

Discussion.—The problem of welding the large tubes used in superheaters was brought up in the discussion. Geo. W. Kelly (C. R. R. of N. J.) suggested that this could be done to advantage in a forging machine, and told of a special job which had been done in this way in his shop.

FROGS AND CROSSINGS.

Thomas F. Keane of the Ramapo Iron Works in a paper on this subject said, among other things, that: For the past six years our company has been furnishing manganese center intersection work in the form of frogs with manganese castings firmly held in place at the points of heavy wear, switch points reinforced with manganese steel at the point where side wear occurs and crossings protected with manganese steel. Cast manganese steel was the first in the field; and improved methods of pattern making, molding and heat treatment now produce such sound castings and tough metal that the cast product, at least at present, bids fair to hold its own against the newer rolled or forged manganese steel.

A common fault of manganese center frogs is that the heel rails work loose. As soon as this happens the rails, bolts and casting are subjected to greater stresses than they should take, and if nothing breaks, at least the wear due to pounding and working up and down is much greater than would otherwise occur. To prevent failure from this cause we have so designed our frogs that not only are the heel rails well protected by the castings, but they are secured by four bolts and two rivets. This may seem a simple remedy, but it has proved effective.

It is well known that the first 30 in. of the point, particularly a curved point, are subjected to the severest wear. By protecting these 30 in. so that the life will be equal to that of the rail at the heel of the switch we obtain a switch with a life equal to that of the adjacent running rail. If we increase the life beyond

this point we do so to no purpose, since when a new rail is laid new switches should also be put in. Consequently it is poor economy to make the manganese point any longer than enough to guard against side wear.

There is an erroneous opinion among many railway men that the point of a frog is the first to wear out. It is clear that if a frog be properly built the wing rail will always support the tread of the wheel until the wheel has advanced on the point, at least to where its width is equal to the width of a rail head. Beyond that place the point rails should be subjected to no greater wear than a straight running rail. With this in view we have made the wing rails of rolled manganese steel. This tough metal does not wear down rapidly, and the point will not go down any faster than the wings.

Discussion.—The use of manganese steel in frogs and crossings was very favorably commented on, but attention was also directed to the fact that it cannot be machined. It must be cast approximately to shape and then be ground, and even that is a difficult matter.

FRAME WELDING.

G. W. Kelly (C. R. R. of N. J.):—We use thermit for making repairs to frames under the engine. The accompanying sketch, Fig. 12, shows a difficult compound weld which we have recently made in the engine house at Elizabethport, N. J. The 1¼ in. hole is drilled through the top rail to give the

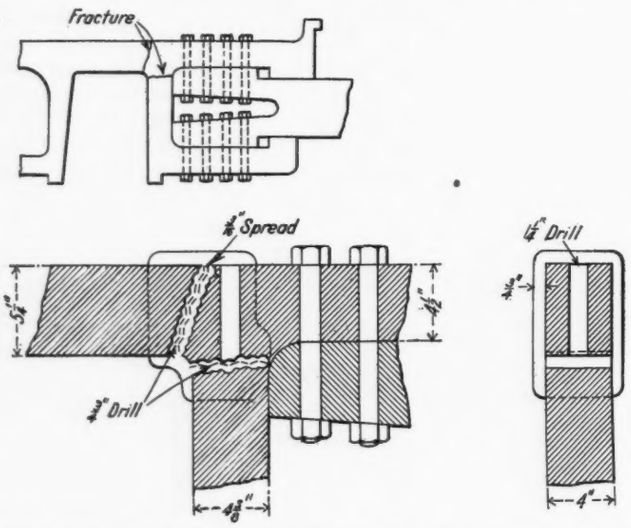


Fig. 12—Difficult Fracture in a Locomotive Frame Repaired by Thermit.

thermit a better opportunity to circulate and the frame will also preheat more uniformly. The pedestal jaw was spread apart 3/16 in. Formerly, when the leg was broken from the top rail of the frame these welds gave us trouble and we have had two or three failures. However, since we have drilled the 1¼ in. hole through the frame into the break, allowing the thermit to circulate around the frame and through the hole we have had no failures.

To prevent the frame from upsetting while preheating and welding, we expand the opposite frame with a slow charcoal fire. When a frame is broken in two or more places in the front pedestal and the engine requires general repairs the broken pedestal is replaced by a steel one which is already machined. Some of these require three welds, as this type of pedestal is welded to the front end of the frame forward of the guide-yoke, thus cutting out the splice and making a continuous frame.

The writer has been asked: "Do you consider thermit welding permanent, and will the weld hold during the life of the engine." Since August, 1906, we have made 186 welds on four different classes of engines where it was necessary to apply new steel front pedestals. Of the above welds we have had but one failure, which was due to unequal contraction. During the last six years we have made many welds at various places on steel and wrought iron frames, driving wheel centers, and steel braces, etc., which have given us no trouble. We have found it very beneficial to keep a record of the welds made and the conditions at the time of making them, so that should a failure occur, by looking up the record we can generally locate the reason.

H. D. Wright (Big Four, Beech Grove, Ind.):—In making a frame the frame back is blocked out ready for the limbs and braces to be welded in place, as shown in Fig. 13. The lugs

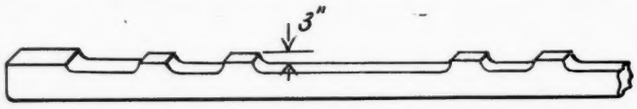


Fig. 13—Frame Back Blocked Out Ready for Limbs and Braces.

should not exceed 3 in. in height; by this method you will avoid having any cross grained iron in the frame legs when the limbs are welded on. Fig. 14 shows how the limbs should be forged and scarfed ready to weld on to the frame back. The boss that is left on the limb for the braces should not exceed 2½ in. in

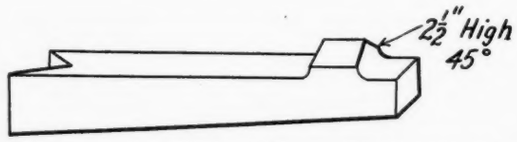


Fig. 14—Limb or Pedestal Ready to Be Welded to Frame Back.

height. Before these parts leave the forging hammer, they should be scarfed to an angle of 45 deg. by the use of a V block and fuller. Then weld the limbs to the frame back in one heat. I prefer to put the frame leg on in one heat, even though the outside scarf does show a little, rather than to have the second heat taken and the center of the iron loosened up by not heating through to the center. It does not do any good to weld up

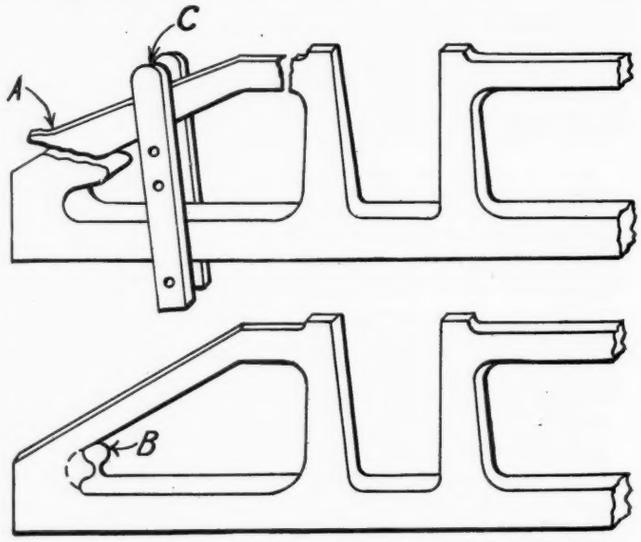


Fig. 15—Method of Putting in the Brace at the Rear End of the Frame.

the outside solid and then take it to the planer and plane it all away, and there are certain heats that open up a weld very easily while working. For example, take two pieces of 2 in. x ½ in. iron, bring them to a good welding heat and lay them down. You will find it a difficult matter to pull them apart when cold.

Take the same two pieces of iron, if you have not pulled them apart, put them in the furnace and bring them up to a greasy heat and you will not have any trouble in separating them. The same condition is true in frame work, and while you may have trouble to get the men to make a weld in one heat in a day work shop, we have no trouble on this score from men working piece work.

The method of putting in the bracing, commencing at the back end of the frame, is shown in Fig. 15. *A* shows the position of the brace before the hammer makes the weld, and *B* is the finished weld. Cut away the extra metal between the frame brace and back as shown by dotted line with a gouge. This

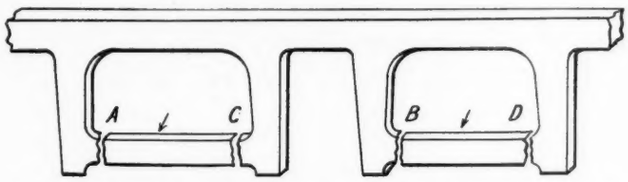


Fig. 16—Showing How the Lower Rails Should Be Welded On.

method will make a sound weld, but care should be exercised that the bevel on the frame back has the correct taper, so that when the hammer strikes it, it will be driven into place. The brace *C* is made of two pieces of 4 in. x 7/8 in. iron bolted fast to the back and the holes are spaced the correct distance to allow the brace to slide into place. When the brace is put in place ready for welding it will stand away some distance from the limb; as a rule we put a block of soft wood between the brace and the limb with the grain running the right way so that when the brace begins to draw the block will split, allowing the brace to come back into position.

Fig. 16 shows the lower rail pieces in place. They should be welded first at *A* and *B*, and then at *C* and *D*. By this method you reduce the strains that come on the legs and a few blows of the hammer on the braces after the weld is made will further remove them. The proper place to strike the braces is indicated by the arrow heads on the sketch.

The front end as used on some of our heavier engines is made in one piece under the hammer and is shown in Fig. 17.

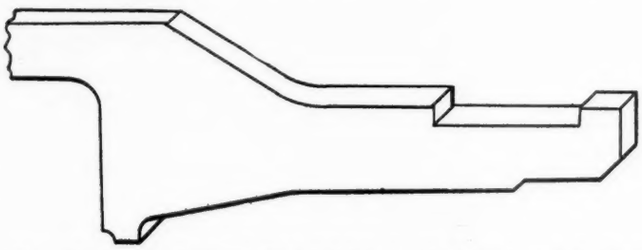


Fig. 17—Type of Front End Which is Machined and Drilled Before Welding to the Frame.

This type of front section is finished in the machine shop and drilled before it is welded to the frame.

The type of front limb that is ordinarily used is shown in Fig. 18, and *A* shows the part ready to weld in place. Weld a small stub on the frame back and then weld on the front limb. In making the offset frame shown in Fig. 19, the back is made in two pieces, and is then welded at *A*, after which the work is handled in the same way as if it were a straight back.

In repairing frames, I scarf all my work on a 45 deg. angle. The component forces are thus equal and the wedge will not take any more of the blow than the scarfed frame piece. The parts will thus weld thoroughly from the point to the outside of the frame.

Repairing Frames Under Engines.—We make all our own preparations and do not call on the machine shop for any help whatever. We have had only one frame that had to be sawed out by a machinist and that was due to the weld being right against the firebox. The type of weld which we use is shown in Fig. 20. In heating the frame member for the purpose of cutting out or welding, we build a brick furnace around the fracture and use fuel oil burners, one on either side. One burner is below the fracture and the other above it. This allows the

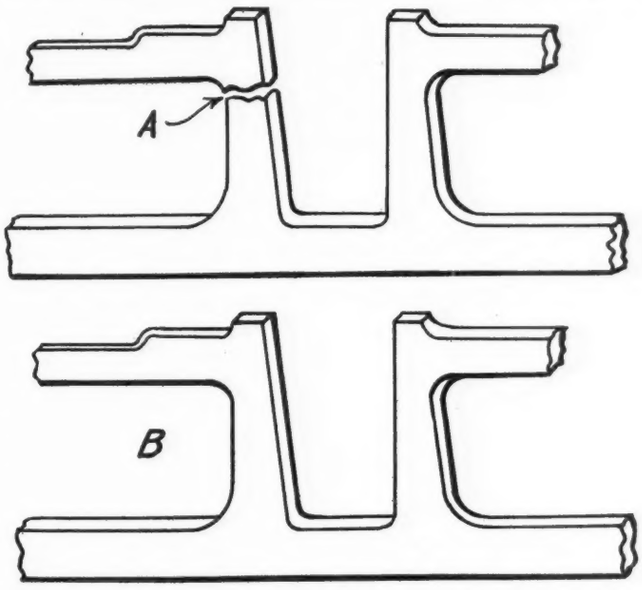


Fig. 18—Method of Welding Ordinary Front End to Frame.

flames to make a circuit around the frame and to heat it up evenly. In building the furnace we always leave two or three bricks on each side so they can be taken out without disturbing the rest of the bricks. This method often saves a great deal of time, for if the weld is not made perfectly on the first heat the bricks can be replaced and another heat taken.

In preparing the frame for welding, we cut it out on a 45 deg.

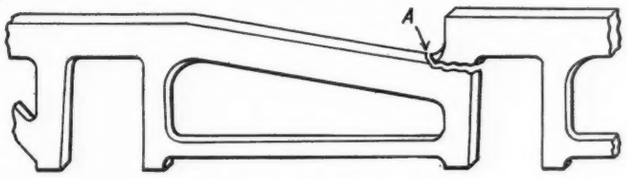


Fig. 19—Making an Off-set Frame.

angle and then warm up and spring it apart 5/16 in. or 3/8 in. We then cut in at point *A* and drive in four wedges to bring up the stock to allow for wasting in welding. The large wedge is then made and is driven into place making a tight fit. When the frame is brought to a welding heat the loose bricks are removed from each side of the furnace and the rams are used. I have successfully welded 136 frames under engines in this way during the past three years.

J. G. Jordan (T. & N. O., Houston, Tex.) :—Repairing frames

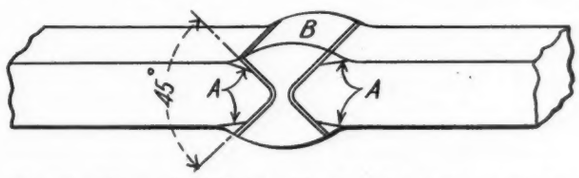


Fig. 20—Type of Weld Used in Repairing Frame Under Engine.

on engines in the roundhouse is a make-shift job, and always will be. You cannot get stock enough on each end of the weld, and the frame will waste away in making your heat no matter

what you heat with—gas, oil, or thermit. But we have to weld them in the roundhouse to keep the engines in service. At present we are welding with thermit. I think it is the best temporary job you can make. A molder is broken in for this class of work, and he makes his own mold and does all his own work, except when taking off the heat, at which time he is assisted by a helper. Of course there are many cases where the frames cannot be welded in the roundhouse; i. e., when they break under or near the firebox, or under the cylinders.

In repairing frames on the anvil we always make the V so that the grain of the iron is parallel with the frame, and we use good iron and coal, a good heater and plenty of stock.

D. N. Dulin (N. & W., Portsmouth, Ohio):—We seldom remove a frame from the engine unless it is badly out of line or broken in such a way that it must be removed. Since the first of the year we have repaired 43 frames with but three failures, and two of these were on the front jaw of a passenger engine. This frame had been removed at some time and a new back put in the front jaw; in the operation the height of the front limb was shortened ⅞ in., causing an excess of stock in the front corners of the jaw; this striking on the driving box caused the frame to break.

In welding the frames with oil we drill 1 in. holes through the fracture, making the holes as close together as possible. We chip out all of the burrs leaving the ends nice and square; then we wedge the frame apart a distance about equal to the amount of contraction. We do not figure on any upset but anchor the frame at this point and leave it until the heat is worked off, after which we release the wedge, which permits the frame to go back to the proper length. When the frame is wedged apart we forge a piece to fit in the fracture. This is cut from the end of a square block of tough hammered iron having the fibers running with the frame. It is fit in nicely, leaving about ½ in. above the frame and ½ in. below, and allowing the sides to come flush. We forge two more pieces, one for each side of the frame. These are 3 in. or 4 in. wide and of a length to suit the height of the fracture, leaving the fibers running with the frame. We drill one or two ⅝ in. stud holes through the plates and into the center piece; then tap out the center piece and screw in the studs, put on the plates and rivet over. This gives a good fiber and saves a mean job of forging T shaped pieces and getting them machined to fit. We then build the furnace by placing 1 in. square bars across the frame and having four small chains with rings in one end and hooks in the other; with these we get any desired height for the furnace. We have two short bars hanging in the lower ends of the chain, on which we place a piece of sheet iron, which forms the foundation of the furnace, which is 18 in. deep, and the length of two fire bricks, giving us about 2 in. above and below the frame. We find that a reasonably long heat will not waste as much as a heat that is crowded. The furnace is of large dimensions and is capable of containing a good deep heat, which is something to be appreciated.

On the inside of the frame the furnace is 9 in. deep and the length of one fire brick; this side is plugged. When all is in readiness we light the burner; this is placed on an iron trestle with adjustable legs giving any desired height. We have two rams; one is made from 1 in. bar soft steel, 10 ft. long and upset on one end the size of a backing hammer; the other made from 1½ in. steel is upset on one end about 3 in. We use the small bar to stick the pad on the side of the frame, and when it gets white and soft we use the larger ram. This is handled by three helpers who drive the pad into the frame. This operation is continued until we have sufficient proof that a good weld is accomplished, after which we turn off the burner and plug up the furnace and then we go to the other side which is treated in the same way, after which we take down the furnace and trim the top and bottom. The ramming process moves the stock half way through from each side and effectually closes any open spaces and makes a perfect weld. A deep mellow heat is infused into the frame and the pads on the side of the frame furnish plenty of stock to work on.

We have done many jobs which have appeared as good as any that came from the anvil, and with much better heat and conditions on account of the superiority of the heat obtained from oil over that from inferior coal. We also have a large size air hammer for trimming up, and gouges and chisels of different

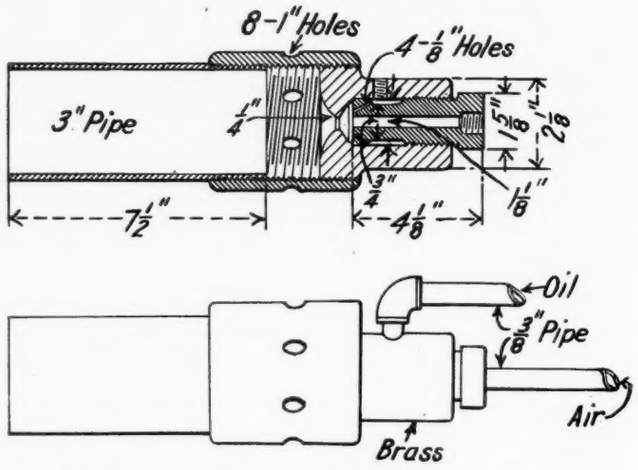


Fig. 21—Crude Oil Burner Used for Frame Welding.

lengths and designs which come very handy when you cannot swing a sledge. We always leave the frame a little thicker than the original frame and slightly higher, if we have room. The work is done by four men, and with despatch. The accompanying sketch, Fig. 21, shows the crude oil burner which we use.

Discussion.—Objection was taken to Mr. Jordan's statement that welds made with the frame in place were makeshifts. If the proper precautions are taken there is no good reason why such welds should not be a success. It is, of course, less convenient and more difficult than working on an anvil, but it is far more satisfactory from the standpoint of cost—both for the actual work done and the time of keeping the engine out of service. It is not necessary to use collars with the thermit weld. If the frame is properly heated before welding with thermit there should be no trouble in getting successful results. Mr. Gamble spoke of the advisability of rounding the edges on forgings and of annealing them before placing them in service. These features should be given more attention.

OXY-ACETYLENE WELDING AND CUTTING.

P. T. Lavender (N. & W., Roanoke, Va.):—Not only has the use of oxy-acetylene given splendid results for making repairs to parts of machinery, but repairs are now being made to worn out parts of locomotive and cars, thus recovering material heretofore consigned to scrap. The use of acetylene has become almost indispensable in the construction of steel passenger cars. In new car work an interesting field is presented in the welding of joints in long roof sheets and plates, cutting off beams, braces, etc. Besides this the joints at the door and window frames are being successfully made; this work is rather higher grade, because the workmanship must be the very best and the surface left smooth and in condition to receive the finish usually applied. Some remarkable work has been accomplished in the welding of steel drills to shanks as small as ¼ in., and many other tools have been similarly repaired, to say nothing of work on such parts as rocker boxes, pulleys, journal boxes, hydraulic jacks, air and water pump cylinders, wheel centers, electric machinery, generator bases, filling improperly drilled and enlarged holes in most any part of the machinery of a locomotive for the purpose of re-drilling and re-boring to size and thus recovering the worn

or damaged part, welding or adding material to piston rods for the purpose of reproducing the proper and standard crosshead fit, building up metal on feed screws for lathes, welding locomotive side and main rods and broken and cracked locomotive cylinders. In valve motion work alone, it has become almost indispensable in recovering worn and broken parts.

The apparatus is most valuable for filling blow holes at critical places in castings, large and small, and also for cutting off the gates of steel castings. The latter work can be done quite as readily and more economically under certain conditions than with the saw. Special emphasis should be given the very wide and useful range of work to which it has been put in the boiler shop, and particularly in cutting out firebox sheets and welding patches; if the work is properly handled the operation can be executed in such a way that no calking of joints, renewal of rivets, etc., is necessary. In cutting out sheets of fireboxes for renewals or for patches, the speed that can be obtained is remarkable. It has been demonstrated that an operator can, if skillful, do as much work in three hours as three or four boiler makers and helpers are able to accomplish in several days. It usually requires about an hour or an hour and a quarter for a skillful operator to cut out two full side sheets and a half door sheet of a large modern consolidation locomotive, whereas cutting it out by hand would require two or three men as much as ten hours to accomplish the same work. Not only is the process valuable in removing sheets, but it is equally valuable in welding patches in firebox sheets.

It is estimated that plates from ¼ in. to ¾ in. thick can be cut at the rate of about 30 ft. per hour. Tests have been made showing a cutting speed as high as 8 ft. per hour on very thick metal, and it appears that the composition of the steel or the treatment it has undergone has no effect whatever upon the cutting speed or the consumption of gas. There is practically no variation between rolled or forged iron, or cast, drop forged, tempered, hardened, carbonized or Harveyized steels. The statement has been made that the harder the material the more readily it can be cut on account of its density. The position has been taken that we should be able to successfully weld flues in locomotive boilers by the use of acetylene. The sooner we succeed in securing a substantial and more servicable joint between the flue and the flue sheet, and a joint less disturbed by expansion and contraction, corroding and the other influences, the sooner we will be able to have relief from leaking flues; but to be able to successfully handle this particular operation by welding, either by electricity, acetylene or otherwise, remains to be seen.

Some interesting experiments have been made at the University of Illinois, and the conclusions reached by Professor Whitmore, are as follows: It is important in manipulating oxy-acetylene in welding to have thorough fusion of the metal. Too much emphasis has been laid on the effect of the flame regulation, pure oxygen and acetylene, pre-heating and hammering the weld, etc. An efficiency of 85 per cent. is as high as can be expected in practice if the weld is the same thickness as the plate. In the same article the statement is made that if the metal is built up towards the operator, the procedure is comparatively easy, but upon this point there seems to be some question, as some very successful operators claim that better work can be accomplished by working in the opposite direction.

George Hutton (N. Y. C. & H. R. R., Albany, N. Y.):—There have been failures with oxy-acetylene welding, but we must not forget that there have been many failures with other methods of welding. Would any of us have the ordinary handy man make a weld at a forge on an important piece of work and expect something good? That is what we seemingly expect from any of the new methods of welding. Many of us are ready to condemn oxy-acetylene welding, because it looks like a soldered job, and many believe it cannot be hammered. This is wrong in many cases, as it can be hammered enough to give the proper laminitations for 75 per cent. of the jobs in the smith shop. For cutting up material, such as old frames, or other scrap it is ideal.

Discussion.—The value of the oxy-acetylene process in reclaiming worn and damaged parts was commented on. The general opinion seemed to be that while oxy-acetylene welding has certain limitations, there is no doubt but that it can be used advantageously for welding thin parts.

CASE HARDENING OR CARBONIZING.

William F. Stanton (J. A. Fay & Egan Company):—Steel containing from .012 to .015 per cent. of carbon is best where it is desired to have a hard shell outside for wear and a tough core or center to withstand the shock and strain. The factors that influence the final result of case hardening are: (1) the temperature of the furnace; (2) the time the piece is submitted to the carbonizing process; (3) the nature of the carbonizing material; (4) the heat treatment which follows carbonizing; (5) the nature of the steel. The table herewith may be of interest as giving the penetration of carbon per hour as commonly accepted for various elements when present in steel:

PENETRATION OF CARBON PER HOUR.

0.5 per cent.	manganese	0.043 in.
1.0 per cent.	"	0.047 in.
1.0 per cent.	chromium	0.039 in.
2.0 per cent.	"	0.043 in.
2.0 per cent.	nickel	0.028 in.
5.0 per cent.	"	0.020 in.
0.5 per cent.	tungsten	0.035 in.
1.0 per cent.	"	0.036 in.
2.0 per cent.	"	0.047 in.
0.5 per cent.	silicon	0.024 in.
1.0 per cent.	"	0.020 in.
2.0 per cent.	"	0.016 in.
2.0 per cent.	"	0.000 in.
1.0 per cent.	titanium	0.032 in.
2.0 per cent.	"	0.028 in.
1.0 per cent.	molybdenum	0.036 in.
2.0 per cent.	"	0.043 in.
1.0 per cent.	aluminum	0.016 in.
3.0 per cent.	"	0.008 in.

The rate of penetration for ordinary steel would be about .035 in. per hour. It will be readily noticed that manganese, chromium, tungsten and molybdenum increase the rate of penetration slightly. Nickel, silicon, titanium and aluminum retard penetration. Most of the alloy steels are made in special grades for carbonizing, dependent to some extent on what use it is intended to put the parts to. To illustrate: Vanadium steel that gives the best results for crank shafts, connecting rods, and other moving engine parts is composed of .025 to .035 carbon, .040 to .050 manganese, 1 per cent. chromium, and 016 to .018 vanadium; while the best carbonizing steel has .012 to .015 carbon, .020 manganese, .030 chromium and .012 vanadium.

Good and even carbonizing depends on the degree of temperature maintained during the heating process. It is essential that the temperature be kept at a definite point as nearly as it is possible with the means at hand. If the temperature is too high, the metal will crystalize and the core will become brittle. The temperature to which the steel can be raised safely varies according to the kind of steel used. Ordinary carbonizing steel cannot be safely raised above 1,800 deg. Fahr. If the carbon content of the steel is high, even this temperature should not be reached. Several of the alloy steels, such as nickel-chrome, can be heated to a temperature of 2,000 deg. Fahr., without doing any appreciable harm, if the carbon content is extremely low; in this case the penetration of the carbon is high without resultant crystallization of the core. The temperature in carbonizing ranges between 1,300 and 1,800 deg., and should never be below, as saturation does not take place and the higher heat effects both the per cent. of carbon absorbed and the speed of penetration. The nature of the carbonizing material has an influence on both the speed of penetration and the per cent. of carbon absorbed, and the material used should be of known chemical composition.

Powdered bone, charcoal, charred leather, cyanide of potassium, bichromate of potassium and many other materials give good results, and we have tried a number of them on gears, slides, ball bearings, set screws, mandrels, etc., with excellent results. Hard charcoal and bone give good results on nickel-chrome steel by

packing in a box and raising the heat to 2,000 deg. Fahr., and maintaining it for about four hours, allowing it to cool slowly before taking the parts out of the box or uncovering it. There are several other methods, such as carbonizing in a gas furnace, but this is for small work only and requires expensive equipment. Harveyizing armor place with a bed of charcoal over the plates, and the gas turned on so the steel will be heated through, allowing the carbon to soak in from the top, is a successful process; it has the fault of distributing the carbon to unequal depths over different portions of the plate and is not satisfactory for small work.

The heat treatment after carbonizing should be carefully handled, owing to the fact that the piece should retain its hard outside surface to resist wear and have a non-brittle core to resist strain. Some methods of heat treating have a de-carbonizing effect, while some steels have a tendency to crack or warp; in many cases it is wise to anneal after carbonizing. This is done by leaving the pieces in the box with the cover fastened on and allowing it to cool gradually. If the carbonizing temperature has not been over 1,600 deg. Fahr., it can be allowed to cool to 750 deg., and then reheated to 1,400 deg., and quenched with good results. If the temperature in heating has been over 1,800 deg., the pieces should be allowed to cool to 1,650 deg., and be quenched and then reheated to 1,400 deg. and quenched. The reason for double quenching is that the pieces must be heated above transformation (1,650 deg.) to destroy the crystalization which the core would have, if quenched at a high temperature, thus leaving the case hardened surface layer not hard enough to resist wear; therefore quenching must take place the second time at 1,400 deg. Fahr.

Carbonizing with materials of the nature of powdered bone, charcoal, potash, etc., by means of a packing in a cast iron box, is considerably slower than when the gases are used in a gas furnace, owing to the necessity of the heat penetrating the cast iron box and carbonizing the materials before it can effect the work.

PIECE WORK.

Henry Mangeot (C. H. & D., Cincinnati, Ohio) :—About 14 years ago only about 1 per cent. of the work in the railway smith shops throughout the country was being done by piece work. This has gradually increased until I think it would be safe to state that there is about 65 per cent. of the work being done on a piece work basis in these shops today. It has been demonstrated that not only is the employee benefited, but the employer also. I have in mind a certain shop that had sixteen fires in operation and was scarcely able to keep up with the average output of locomotives. Piece work was installed on a small scale. The men did not seem to exert themselves much harder than before, but they made every move count. It was unnecessary for the foreman to get after a man for taking two heats when one would answer the purpose. It was to the man's advantage to see to that part of the work himself and not make any unnecessary work for it would decrease his net earnings per day.

The hand tools which belong to the smith in a piece work shop are kept in a much better condition than those in a day-work shop. His tongs, cutters, punches, etc., are well looked after and cared for. The shop referred to above was working sixteen fires before installing piece work; today it has only eleven fires and produces more work than formerly. The same foreman is supervising the shop with practically the same class of men he had in the start. There were some lazy mechanics that could not keep up with the pace who were compelled to step down and out; there is no question but that piece work rids the shop of drones, as you will find the average piece worker is a hustler.

When a man can work with his head as well as his hands and make from fifty to seventy-five cents more a day by working piece work, he will naturally take to it. It has been my experience that when a man once gets a taste of working piece work you generally have trouble on your hands when you ask him to work day work. The piece work inspector should be a diplomat, a close observer and by all means fair and honest. A dishonest piece work inspector is a dangerous man to have around. This man generally fills a position of assistant foreman in a blacksmith shop and is among the men at all times, checking them up and inspecting their work and giving such orders as may be in his line.

I believe it can be more satisfactorily worked in a large shop that does a great deal of manufacturing, as one man can be assigned to making some particular line of forgings. It can, however, be handled in a shop no matter how small; you may have a variety of different classes of work each day, and it is of course a little more difficult to work piece work than in the larger shop. Piece work and shop kinks go hand in hand. Take a piece work shop with a nice collection of shop kinks, and it is surprising to see the output that can be turned out per smith. There should be a liberal appropriation set aside for the tool room for making shop kinks for blacksmith shops.

SPRING MAKING AND REPAIRS.

John Engels (C. C. C. & St. L., Bellefontaine, Ohio) :—In handling the repairs of springs we use as much of the old steel as possible. If the springs are too low in set they are reset and tempered. If we find the set all right, and where there are not more than three or four plates broken, we put in new plates without resetting the spring. In setting springs we leave the first and second plate stand off 5/16 in. to ½ in., and give the plates a gradual taper to the top plate. Every precaution is taken to see that the plates fit to each other.

We draw out the plates with an oval tool under the steam hammer. We also weld pads on some of our main plates, trim, finish and punch the slot when necessary with the steam hammer while the steel is still hot. We also use a malleable clip on some of our main plates. For a tempering bath we use a tank about 6 ft. long and 24 in. wide with a depth of 18 in. This tank holds two barrels of fish oil and is placed in a tank of water with about 3 in. of space on all sides, including the bottom, to keep the oil as cool as possible.

Discussion.—The importance of knowing and understanding thoroughly the quality and properties of the steel used for the springs was emphasized. G. M. Steward (Pennsylvania) mentioned some experiments which were being made at Altoona to reduce the cost of manufacture and maintainence of springs. The leaves are being made on a bulldozer, only one set of dies being used for all the leaves in a spring. In this way the parts are all standard and the repairs will be much less expensive.

HIGH SPEED STEEL.

George Lindsay (C. & E. I., Evansville, Ind.) :—It has been said that we should burn the point off a cutting tool in order to harden it, and only the very point. This works out fairly well on lathe and planer tools, because it is not hard to grind them 2 or 3 times until they are right. How often have you heard that such a tool was not any good until it was ground two or three times, but you cannot treat a milling cutter, a tap or reamer by that process. If you do not get the proper heat on the latter class the first time, the efficiency of the tool is, if heated too high, reduced permanently not only for wear, but also in output of work which may cost many times more than the tool. We have been told that 2,300 deg. Fahr., is the limit or critical point for a certain high speed steel, and that 100 per cent. efficiency is obtained very close to this; also that a few degrees more will reduce the efficiency 50 per cent., and again that 2,150 deg. will be too low and also reduce the efficiency about 50 per cent. The only sure way is to have a pyrometer.

It is surprising how unconsciously some men will hammer high speed steel at a low heat as if they were refining carbon

steel before they were going to harden it. This is good practice for a chipping chisel, but bad practice on lathe tools. It is also important that high speed tools be so forged as to have a good backing of metal in order to carry away the heat by absorption into the heavy backing. As to hardening; wherever it is practical to use compressed air as the cooling medium I use it; true that oil can be used too on some such tools as cannot very well be evenly cooled with air. Salt hot water may be used in cases of emergency, but I do not like it.

J. L. Keller of Purdue University gave an interesting talk on the effect of heat on the structure of iron and steel.

W. V. Young of the Hoskins Manufacturing Company gave a most interesting illustrated lecture on the heat treatment of high speed steel.

SPECIAL WELDING AND THREADING STEEL.

V. S. Yarnall (Carnegie Steel Company) presented a paper on this subject of which the following is an abstract:

It has been the standard practice for some years to use high carbon steels for numerous parts of locomotives, such as axles, main and side rods, piston rods, motion work pins, etc. Low carbon steel suitable for general forgings is of a more recent development, and has put into the hands of mechanical men a material that is showing a high standard of excellence, as well as a reduction in the cost of working and maintenance.

It would have been possible, when introducing special steel for railway equipment, to have put on the market a steel that would weld, bend, and forge as well as machine, but it was found that steel made to have a good welding quality was made at the sacrifice of the machining and threading quality, and vice versa. Therefore, the conditions seemed to demand that two grades of material, instead of one, be available for railway work. The Carnegie special welding steel was designed to give the highest efficiency to parts that are to be welded, forged, or merely bent, and is being used for such parts as equalizer bars, arch bars, spring hangers, reverse shafts, mud rings, coupler pockets, brake connections—in fact is suitable for all classes of welded, forged or bent work. The Carnegie special threading steel was designed to have a free cutting quality, and is being successfully used for locomotive frame bolts, cylinder bolts, stud bolts, valve rod and transmission bar pins, special tapered and turned all over bolts, brill nuts, car bolts, etc., and is best suited for work that does not require welding but may require forging and subsequent machining or threading. Physical tests have shown that these steels possess an ultimate strength equal to the best grades of material now specified by the railways for general forgings intended for locomotive and car parts, with a relative high elastic limit and ductility beyond that of ordinary soft steel.

WELDING STEEL.

Heating for welding or forging is one of the most important operations in the working of material. While this fact is known by all good mechanics, still, for various reasons, it is too often overlooked. Overheating, or the application of heat too rapidly on parts that do not receive subsequent work or forging, frequently occurs, especially in shops where the operator is working on the piece work plan, resulting in the material being left in a weakened, brittle state. It is necessary to use at least ordinary care in heating.

The welding is as simple as welding refined iron, and requires as much care. Excellent results can be obtained with or without the use of flux, depending on the character of the work. Sand as flux is very effective. Numerous physical tests made of welded bars of this grade of steel show that the majority of them have a tensile strength of over 90 per cent. the strength of the original bar.

Forging:—The welding grade of steel offers many advantages for this class of work; being very ductile, it can readily be formed into the desired shape at any workable temperature, either in a forging machine or under the hammer, without injury to the metal. On account of its homogeneity, parts that are made of it will practically be of equal strength, both longitudinally or transversely.

Recovering or Refining the Grain:—There are forgings made at times, which, from the nature of the design or for other reasons, make it impossible to heat for welding without heating beyond the portions that will eventually receive work when being welded. This particular overheated, unworked portion will be left in a coarse granular state. It is often essential that the finished forging be in the best possible condition throughout. Where Carnegie special welding steel is used, such parts can be recovered or refined by reheating to the recalescent point, which is about 1,500 deg. Fahr., and allowing them to cool in the air. The overheated portion will then be found to be fine in grain and in good condition. This treatment will benefit any grade of commercial forging steel that has been overheated—of course, providing it has only been slightly overheated and not badly burned.

THREADING STEEL.

This grade of steel, whose qualifications have already been noted, will flow readily into the various forms usually made on a forging machine at an orange to bright orange heat, without injury to the metal. For all parts requiring hardened surfaces, such as motion work pins, the usual method of case hardening by immersing the hot part in cyanide of potassium, or packing in bone and subjecting to heat, has been found to be very efficient.

ELECTION OF OFFICERS.

F. F. Hoeffle of the Louisville & Nashville, Louisville, Ky., was elected president; J. T. McSweeney, Baltimore & Ohio, Mt. Clair shops, Baltimore, Md., first vice-president; Harry E. Gamble, Pennsylvania Railroad, Juniata shops, Altoona, Pa., second vice-president; A. L. Woodworth, C. H. & D., Lima, Ohio, secretary-treasurer, and G. H. Williams, Boston, Mass., chemist.

RECLAIMING SCRAP MATERIAL.*

BY T. S. SHEAFE,

Engineer of Tests, Illinois Central, Chicago, Ill.

Brake Beams.—Brake beams constitute one of the largest items of consumption in railway operation, and in freight equipment the beam of "I" section is almost a universal standard. These beams become bent in service and when heated and straightened lose 25 per cent. of their strength and are unfit to return to service, owing to their weakness. By reinforcing them with a 2 in. x 2½ in. angle iron, at a total cost for labor and material of 63 cents each, the result is a beam stronger than the original one. When the work is properly done the reinforced beam will not return for repairs because of being bent, but rather for a new head, or fulcrum. On the Illinois Central an average of over 500 such beams are thus repaired each month with a saving of about $1.25 each, or a total of $625. The reinforced beam is shown in Fig. 1, and the shop in which the work is done in Fig. 2. The shop contains a large oil furnace in which the beams are heated, a face plate on which they are approxi-

Fig. 1—Reinforced Brake Beam.

*Entered in the competition of this subject which closed July 15, 1911, and awarded the second prize of $20.

mately straightened and formers operated by twin air brake cylinders which form them to exact shape.

Rolling Mill.—Truss rods, heavy bolts, etc., when pitted and rusted are of no value other than for making slab iron or selling for No. 1 wrought scrap. A small 2-high, hand round rolling mill, Fig. 3, most primitive in its construction, and belt driven, will turn out an average of over 68 tons of rerolled

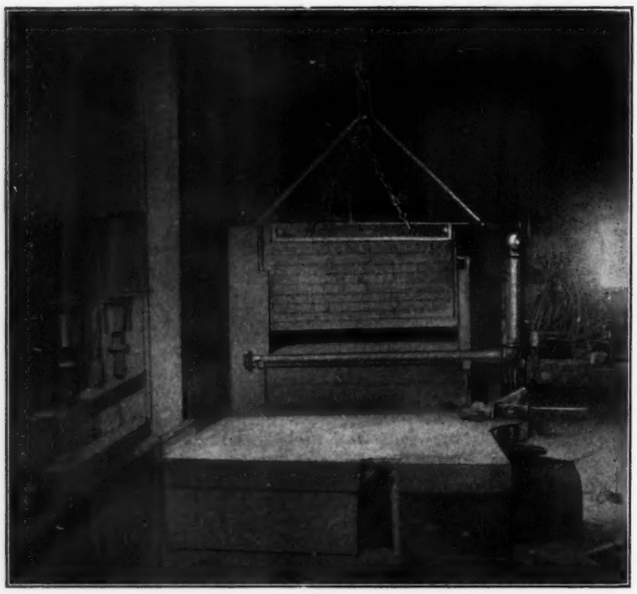


Fig. 2—Partial View of Shop in Which Brake Beams are Repaired.

scrap per month. The saving per ton is over $12, or a total for the month of over $800. Four men and one laborer are required to operate the mill, a part of the latter's time being put in on other work. The other equipment necessary is an oil furnace, shears (Fig. 4) and engine (or motor). A 3-high modern set of housings would enable the output to be greatly increased. The benefits other than the neat saving are, a further refining of the iron and the ability to reduce larger en-

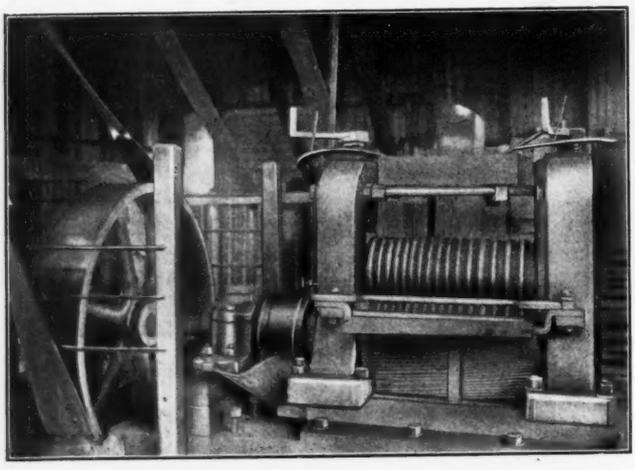


Fig. 3—A Small 2-High Hand Round Rolling Mill.

gine bolt and staybolt iron when a desired size is out of stock. This has several times saved the day in locomotive work.

Paint.—The most valuable ingredients of paint are contained in the "skins" and "slops." Usually these are wasted. On the Illinois Central they are collected, shipped to the Burnside shops and placed in a large upright tank on wheels. Raw oil is added and the whole mass is carefully boiled, the oil taking up both skins and pigment. The desired shade is matched and a first class paint is obtained at a fraction of the regular price. An average of 450 gals. per month is thus made at a cost of: labor,

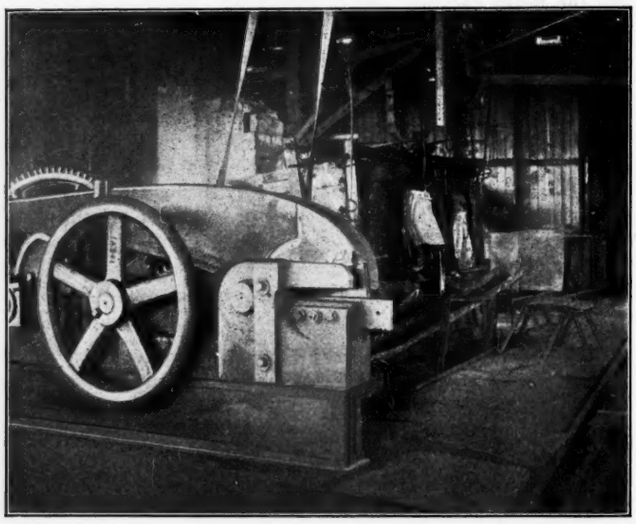


Fig. 4—Oil Furnace and Shears Used With Rolling Mill.

$14.50; material, $168; or a total cost of $40.55 per 100 gals. This is much superior to a paint costing 80 cents per gal. The saving is therefore 39½ cents per gal., or $177.75 per month.

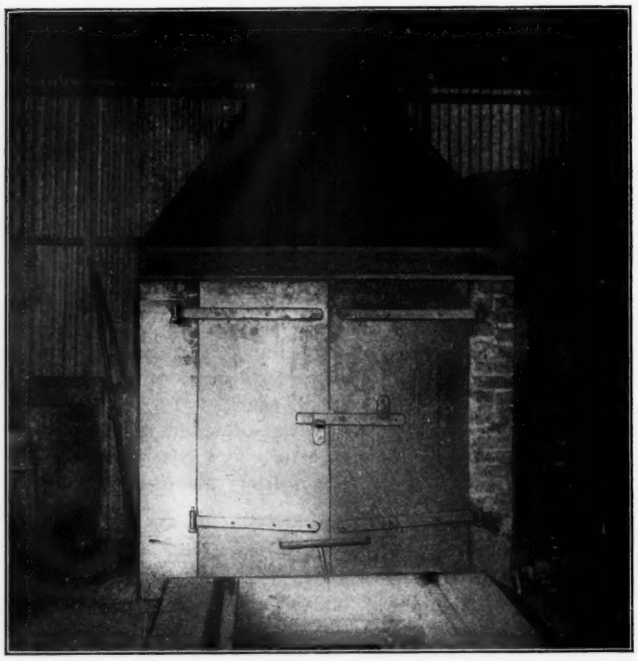


Fig. 5—Hood Under Which Paint Skins and Slops are Boiled.

Fig. 5 illustrates the construction of the hood in which the boiling kettle is placed.

The Lagos Government Railway, Nigeria, is now being extended from Jebba to Zungeru, a distance of 123 miles, and from Zungeru it has been continued for about 37 miles by the Northern Nigeria Government to Minna, where a junction with the Baro-Kano line has been effected. The latter portion of this extension is completed, and it is expected that the first part from Jebba to Zungeru, will be finished by the end of this year. In this section the line has to cross the river Kaduna, and for this purpose a large bridge has been constructed.

General News Section.

The Panama Railroad is to build at Colon Beach a hotel to cost $500,000.

The Illinois Central has ordered the discontinuance of the use of green flags as tail-end markers on passenger trains.

In the shops of the Missouri, Kansas & Texas at Sedalia, Mo., employing 700 men, the work day has been reduced from ten hours to nine.

The Canadian Pacific Railway has made an increase of eight per cent. in the pay of 15,000 mechanics employed in Western Canada.

The legislature of Connecticut has acted favorably on a bill making $10,000 instead of $5,000 the limit of damages recoverable for death due to negligence.

Suit has been brought against the New York, New Haven & Hartford in the Federal court at New Haven, for violation of the 28-hour law in the transportation of cattle.

Governor Colquitt of Texas has sent a special message to the legislature, recommending the enactment of a law making more liberal the statutes authorizing railway companies to issue bonds.

The Wells-Fargo Express is to move its accounting department from New York to Chicago, and about 200 employees will have to change their residences. It is said that the company will pay the employees' moving expenses.

The strike at the Baldwin Locomotive Works, Philadelphia, which was begun on June 8, has been abandoned. The newspapers say that 12,000 men struck and that about 10,000 of them had returned to work before this order was given.

The educational bureau of the Illinois Central had received 3,745 applications from employees of the road for membership up to July 31. The number of applications received up to July 8 was 394, the establishment of the bureau having been announced in June.

The tax assessment of second class railway property in the state of New Jersey this year is based on a valuation of $99,978,394, which is $26,393,936 greater than last year. The larger valuation is that made by Special Commissioner Charles Hansel, as revised by the state board of assessors.

The telephone is now used exclusively on the main line of the Pennsylvania Railroad between Philadelphia and Altoona for all wire communications, except messages passing from one division point to another or farther. Between Philadelphia and Harrisburg even the time signals are sent by telephone.

The shops of the Seaboard Air Line at Savannah, Ga., were destroyed by fire on the night of August 18; loss $100,000. The fire started in the blacksmith's shop and spread throughout the machine shops and roundhouses, though the locomotives in the roundhouse were saved. Four hundred men were thrown out of employment.

The Merchants' Protective Association of Lewistown, Pa., has complained to the Pennsylvania that the annual passes which the company gives to its old employees have damaged business, as these employees take advantage of bargain sales in the larger cities. Some of the employees say that if the merchants do not withdraw their complaint, a community store will be opened.

The Pennsylvania railway has notified connections that henceforth it will refuse box cars designed to carry 20 tons or less, except ventilated cars from the south carrying perishable freight. Light cars are now an element of danger in many trains, because of the great preponderance of heavy cars. When its own cars are taken out of service, because of low capacity, the Pennsylvania destroys the bodies by burning them, for it has found that, when sold to other roads, they frequently reappear on the Pennsylvania.

In its investigation into the express rate and service situation in Indiana the railway commission of that state has prepared a list of 37 questions for the companies to answer, with the view of getting complete information. Numerous inquiries are made regarding earnings, ownership and agreements of all kinds. The commission also wishes to know the number of men employed, how many are employed in offices, and how many outside; the amount of pay received by express agents; the number of men employed as division superintendents, route agents, messengers, transfer men, clerks, drivers, helpers and stablemen. A complete list of the points in Indiana where express collections and deliveries are made is asked, with information as to how a delivery limit is established. The total mileage in Indiana and the roads over which this is operated furnish the basis for other questions.

Around the World in Forty Days.

Andre Jager-Schmidt, representing a Paris newspaper, arrived in that city on August 26, after having traveled around the world in about 4 hours less than forty days. Mr. Jager-Schmidt left Paris July 17, at 1:45 p. m., and traveled by way of Moscow Vladivostock, Yokohama, Vancouver, Montreal, New York and Cherbourg. The best previous record around the world is said to be 63 days. Mr. Jager-Schmidt traveled about 19,500 miles, or an average of 487½ miles a day. From Cherbourg to Paris he used an automobile.

Retrenchment on the New Haven.

President Mellen, of the New York, New Haven & Hartford, has issued a statement in which he says: "Business is of such a character at the present time and the outlook for the future is such as to require the strictest economy in the handling of the railway. Every one will be laid off that can be. Nothing will be started, and only such work will be continued as will cost more to leave uncompleted than to finish." The road has laid off about thirty enginemen since the middle of August. The following improvements will not be delayed: the proposed railway across Hell Gate to connect with the Long Island and the Pennsylvania, and the New York, Westchester & Boston, money for which has already been provided. The following will be considerably delayed: the Westchester Northern, from White Plains to Danbury; further electrification east of Stamford; construction of a station at New Haven; electrification in and near Boston, and other minor improvements. The comprehensive projects for improving the Boston & Maine and the Maine Central are held in abeyance, and the same may be said of the station-connecting tunnel project at Boston, and of the Springfield station and river-front projects.

St. Louis to New York in a Flying Machine.

Harry N. Atwood, flying in a Burgess-Wright aeroplane, arrived in New York City August 25, in 11 days, 6 hours, 30 minutes from St. Louis, Mo., having flown in the same machine all the way. The journey was made by way of Chicago, Elkhart, Toledo, Cleveland and Buffalo, thence following pretty closely the line of the New York Central. Stops were made over night and some delays were necessary to repair the aeroplane; and the time actually used in flying 1,369 miles is reported as 28 hours, 27 minutes, or at an average rate of nearly 48 miles an hour. The journey, by days, is given as follows, but there were eight other stops not mentioned in this record:

	Arrived.	Departed.	Distance, Miles.
St. Louis		August 14, 8:05 a. m.	...
Chicago	August 14, 6:19 p. m.	August 15, 3:31 p. m.	286
Elkhart	August 15, 5:47 p. m.	August 16, 8:06 a. m.	101
Toledo	August 16, 3:57 p. m.	August 17, 10:29 a. m.	133
Cleveland	August 17, 4:41 p. m.	August 18, 4:30 p. m.	123
Swanville, Pa.	August 18, 7:10 p. m.	August 19, 11:54 a. m.	84
Buffalo	August 19, 7:02 p. m.	August 20, 3:20 p. m.	99
Lyons, N. Y.	August 20, 5:31 p. m.	August 21, 4:24 p. m.	104
Belle Isle	August 21, 7:17 p. m.	August 22, 4:55 p. m.	40
Fort Plain	August 22, 7:05 p. m.	August 23, 7:15 a. m.	95
Castleton	August 23, 9:20 a. m.	August 24, 7:40 a. m.	67
Nyack	August 24, 11:30 a. m.	August 25, 1:53 p. m.	109
New York	August 25, 2:35 p. m.	.....	28

The distance from St. Louis by way of Chicago, Buffalo and Albany to New York is calculated at 1,265 miles; to which should be added about 4 miles from the railway station at Forty-second street, to Governor's island, where Atwood landed; but Mr. Atwood estimates that, including a few detours, he tra-

veled 1,369 miles. For this flight, which is 101 miles longer than any similar previous feat, Mr. Atwood received a prize of $10,000, paid by Victor J. Evans, a patent lawyer of Washington. His expenses on the trip are said to have been over $5,000. His manager and helpers traveled by railway and automobile.

Missouri Pacific Improvements.

B. F. Bush, president of the Missouri Pacific, says that for the second and third weeks of August the local business of the road was the heaviest in its history for any like period. Although traffic was heavy, the business was handled without congestion, as the track and equipment have been considerably improved in the past few months. When Mr. Bush took charge of the road about 30 per cent. of the locomotives were in bad order. Now 4,500 of these cars have been put in standard condition, and the percentage of engines needing repairs has been reduced to 13. Since May 1, 3,600,000 new ties have also been laid, making total replacements since January 1, 4,500,000. About 380 miles of track is being laid with new 85-lb. rails, and 500 miles of line is being ballasted.

Demands of Shop Employees on Western Roads.

The demands of railway shop men employed on the Harriman Lines and various other western roads for recognition by the roads of the recently organized federation of all railway shop employees continue to be the cause of conferences between officers of the roads and representatives of the employees. A conference was held in Chicago on August 24 between J. Kruttschnitt, director of maintenance and operation of the Harriman Lines, and J. W. Kline, president of the International Brotherhood of Blacksmiths. Mr. Kruttschnitt left Chicago for San Francisco after the conference, having stated to Mr. Kline that he would be willing to confer with a delegation of union officers. On August 26 Mr. Kline made an appeal to Robert S. Lovett, president of the Harriman Lines, to grant a conference to representatives of the unions in order that peace might be established. Mr. Lovett replied that he did not care to interfere, and that he approved the stand taken by Mr. Kruttschnitt in refusing to treat with the federation of mechanical trades. Mr. Kline then wired to Mr. Kruttschnitt asking where he would meet officials of the brotherhoods, and also sent messages to the heads of the other unions urging them to keep the workers from quitting their posts until a final effort toward adjusting the controversy could be made. Mr. Kruttschnitt, who continued on his way to San Francisco, referring to the demands of the shop men, declared that acquiescence in them would mean chaos and inability of the roads to meet the public's requirements. He made public the following analysis of the employees' demands:

"These are the reasons why we decline to surrender to an irresponsible committee of federated employees, representing a very small portion of the public, trusts confided to us by the entire public and why we will not concede to such a committee the right to dictate whether we shall or shall not fulfill for twenty millions of people in seventeen states the duties clearly prescribed by law.

"The employees' demands are substantially as follows:

"First—Recognition of the shop employees' federation. Heretofore issues arising with a machinist, boilermaker, blacksmith, or sheet metal worker were taken up with his associates of that craft. When not successfully adjusted, strikes of that craft have followed, but they were not serious enough to prevent the roads performing the public services for which they were created. Under the change proposed an issue of a small system road in Louisiana might stop all shop work throughout the system by requiring members to strike in California, Oregon, Washington, or Nebraska.

"Second—All present or future employees will join the federated association within thirty days. This means the discharge of all employees who will not join, or an absolutely closed shop.

"Third—That the company agree that the final settlement of differences shall rest with a federated committee representing all five crafts. This would place the employees of all crafts behind a demand made by any one craft and would encourage unreasonable demands not likely to be made by individual crafts.

"Fourth—The restriction of the number of apprentices. This would deny to American boys the opportunity to learn trades.

"Fifth—A flat increase of 7 cents an hour for all mechanics, apprentices, and helpers; an average for the entire shop forces of 23 per cent.; and a reduction of hours and other demands averaging 13 per cent. additional [or 36 per cent. in all]. The Southern Pacific is now paying higher wages than any other railway in the United States, and has increased the pay of all shop crafts 12½ per cent. in the last five years.

"Sixth—The abolishing of piece premium, or bonus systems, shop foremanship to be filled by promotion from federation employees. This is in direct conflict with the public, recently expressed, that increased expense of carriers should be met with increased efficiency of operation and not by increase of freight rates.

"Seventh—That no form of physical examination or personal record shall be required. This denies to the company the right of every citizen to require of persons offering service evidences of competency, good character and health, and deprives the companies of all protection under the fellow servant laws of many states.

"Eighth—That if forces are reduced, employees are to indicate who should be laid off. This would embarrass the company in efforts to increase efficiency by ridding the service of inefficient employees.

"Ninth—That no employee belonging to the federation be discharged without consent from the employees committee. This would require the company involved to meet a committee representing all its craftsmen, which committee would owe allegiance to a general committee composed of allied crafts, men of the Harriman system."

It is announced that shop men employed by the Chicago & Northwestern have given notice to the management that a raise in pay will be demanded next month, when the present agreement expires.

A step which seemed to indicate that a peaceful settlement of affairs on the Illinois Central is probable was made when the executive board of the federated shop employees on that road decided to leave the strike question in the hands of the presidents of the various unions.

The demands above summarized by Mr. Kruttschnitt were printed in full in the *Railway Age Gazette* in its issue of August 25.

Mails by Freight Train.

The post office department announces that the transportation of second class mail matter (monthly magazines) by freight trains will be begun September 1. This means of economizing in the cost of transportation of the enormous quantities of monthly magazines sent out from New York City was proposed several months ago, and was to have been introduced on July 1, but was postponed until September 1 in order to begin the new arrangement coincidently with a new basis of payment, as calculated on a new weighing of the mails. On the roads where freight trains are to be used all mails will be weighed for the next three months. The magazines will be carried as usual in the mail trains to Buffalo and Pittsburgh, and thence on the fastest regular freight trains to Cincinnati, Chicago, St. Louis, Kansas City, Omaha and St. Paul. Mails going beyond those cities will there resume their places in the regular passenger-train mail-cars.

The publishers are to be permitted to print on the wrapper of each copy or bundle of their publications as a part of the address instructions as to the date on which delivery is to be made. In accordance with this arrangement, postmasters have been directed to carry out the instructions with respect to the delivery of fast freight mail. Publishers have assured the postmaster-general that they will be satisfied with the arrangements.

Twenty-Nine Passengers Killed at Manchester, N. Y.

In the derailment of eastbound passenger train No. 4, of the Lehigh Valley, at Manchester, N. Y., on the 25th, 29 persons were killed, all said to be passengers, and 70 or more were injured. The train is said to have been running at about 25 miles an hour, the speed being limited by rule at this point, which is in or near a yard. The train consisted of two engines, two baggage cars, one parlor car, one dining car, and 10 coaches. The derailment was due to the breaking of a rail, weighing 90 lbs. per yard. The engine and the first five cars passed over in safety, but the next two cars ran off the track, and after running about 200 ft., came to a deck girder bridge over a stream;

and both fell off at the right hand side of the bridge, one being broken in two and crushed, and the other lodging nearly in a perpendicular position, with one end resting against the side of the bridge. Nearly all of the persons fatally injured were in these two cars, and the majority in the first one, which was forced with great momentum against the east abutment of the bridge. The stream, about 40 ft. below the track, was shallow, and no persons were drowned.

An officer of the road gave out the following statement:

"The wreck was caused by a broken rail. The composition of the rail was according to the specifications of the company's experts, both chemists and engineers; and the rail was inspected with the usual care in process of manufacture and was subjected to the usual severe physical test after it was made. The rail was of the unusually high class for which a premium is paid.

"The defect consisted of a 'pipe'—an air hole—in the center of the web of the rail, extending for about 14 in. The defect was such that it could not be detected by inspection. There were also hard spots about 1½ in. in diameter in the ball of the rail in two different sections. The rail was made [at Bethlehem] in December, 1909."

The inspector of the New York State Public Service Commission reported that the rail broke into 17 pieces; and that no defects were found in cars or engines.

The report of a hearing by the coroner at Rochester August 29 says that Robert Job, chemist, put on the stand by the railway, believed that the "pipe" in the web of the rail was not what caused the breaking of the steel, but that it was caused by a flaw in the ball of the rail above the web.

George L. Moore, engineer of maintenance of way, said that usually a pipe in a rail causes the development of a flat spot on the tread, but that in this case no such spot appeared. He showed records from which it appeared that this rail was one of a very expensive lot. The broken rail was open hearth, 20 per cent. cut.

Cost of Public Ownership.

A review of government ownership of the telegraph in Great Britain was recently published in the London *Spectator*. The investigation of the English newspaper shows that public ownership of the telegraph lines has been a costly financial failure. It says:

Forty-five years ago, in 1866, the proposal for the purchase by the government of the British telegraph lines was first advanced, and an allegedly conservative estimate set the cost at $11,500,000. It took nearly three years to complete the negotiations, and in 1869 Parliament appropriated $35,000,000 for making the purchase—nearly three times the original estimate; but in addition to that the government was called upon to pay the railway companies for their freehold interest in the telegraph equipment running along their lines, the right of way having been only leased by the telegraph companies; that meant another $20,000,000—so the acquisition of the business stood the British government $55,000,000. It was still predicted that within twenty years the net revenues would materially reduce the tax rates on the properties of the people. The disillusionment came quickly. For the first two years of government operation there was a small net revenue, but after that the returns could not be made to meet the interest on the capital investment, and for thirty-nine years this enormous interest has been paid out of the exchequer—the pockets of the people. Then telegraph rates were reduced under the popular cry that reduced rates would increase the business and that increase would produce profits—but just the reverse was the result. The cost of maintenance and operation increased enormously under government ownership; and, the revenues falling far below this and the upkeep and necessary improvements constantly calling for more money, the drain on the exchequer became increasingly heavy.

When all these facts are taken into account—namely, the original capital which has never been repaid, the advances from Parliament upon which no interest is charged, and the annual deficiencies on working expenses—it will be found that the aggregate commercial loss to the country by the state purchase of the telegraphs is not less than $175,000,000. Nor can we console ourselves with the reflection that for this $175,000,000 the state has a valuable asset, for that asset, such as it is, involves every year on its working an additional loss of over $5,000,000. From a commercial point of view the purchase has been an unmitigated failure. To reply, as the advocates of state action invariably do, that the public has received compensation in the shape of a more efficient and a cheaper service, is plausible but unconvincing. For even if we make the large assumption that the service is better and cheaper than it would have been if it had remained in private hands, we are entitled to ask by what right the taxpayer is deprived of his money in order to subsidize persons who send telegraphic messages? The latter are a minority of the population; they are mostly well-to-do, and they are principally represented by two classes—purely commercial men, who look upon telegraphing as a business expenditure; and the racing fraternity, who certainly have no special claim to the charity of the taxpayer.

The working cost per one thousand words telegraphed in Great Britain today is actually more than it was thirty years ago. The fatal incapacity of the British government to conduct a business enterprise has here been demonstrated beyond all question or cavil. It is to an experience like this that thousands of well-meaning reformers are seriously inviting the people of the United States today. Is it to be wondered at that conservative and far-sighted business men have little patience with these theorists?

Traveling Engineers' Association.

The program of the annual meeting of the Traveling Engineers' Association, which was held at the Hotel Sherman, Chicago, August 29-September 1, was given in the *Railway Age Gazette* of August 25. This announcement did not give the title of the opening address by Robert Quayle, general superintendent of motive power of the Chicago & North Western; he spoke on The Duties of the Traveling Engineer. The secretary's report showed that there are now 812 members of the association. The treasurer's report showed a balance of $1,328. The attendance was large. A full report of the meeting will be given in our next issue.

Two large rooms adjoining the convention hall, with a total of nearly 8,000 sq. ft. of space, were completely occupied by the exhibits. Sixty companies showed their wares to the railway men, and it was significant as showing the good work of the executive committee that on Tuesday morning when the convention was declared open the exhibits were all in place and the representatives present. The exhibit halls were tastefully decorated in yellow and presented a most attractive appearance.

Among the exhibitors were the following:

Adreon Manufacturing Company, St. Louis, Mo. Campbell graphite lubricating system, American gravity tank hose couplings, D. & L. throttle rod stuffing box and plunger, plaster packing, Security bell ringer, Hanlon locomotive sander, Security back-up valve. Represented by Wm. Miller.

American Arch Company, New York. Security sectional brick arch for locomotives, latest designs. Represented by Le Grand Parrish, C. B. Moore, J. L. Nicholson, J. P. Neff, M. C. Beymer, F. C. Boomer, Chas. A. Coons, L. S. Allen, Charles Pfeffer and Charles Miller.

American Locomotive Company, New York. Photographs of C. & O. Mallet locomotives, B. & O. pusher Mallet locomotive, C. & O. Mountain type passenger locomotive, N. Y. C. new K 3 Pacific type locomotive, C. & A. Mikado type freight locomotive; all of these are equipped with fire tube; superheater and brick arch, rotary snow shovel. Represented by W. P. Steele, Mr. Griffiths and H. K. Trask.

American Steel Foundries, Chicago. Large picture showing one step in manufacture of Davis cast steel wheel, models of Simplex coupler, model complete truck with Andrews side frame Davis wheel and Simplex bolsters, model Hercules brake beam. Represented by W. G. Wallace and J. D. Taylor.

Boss Nut Company, Chicago. Complete line of samples of Boss nuts, showing applications for various kinds of service; literature, etc. Represented by B. M. Osbun, J. A. MacLean and J. T. Benedict.

Bowser & Co., S. F., Fort Wayne, Ind. Oil handling and storage outfits; descriptive literature. Represented by W. C. Simpson.

Buck, W. F., Chicago. Device and chart demonstrating the effect of different grades on water level in locomotive boilers. Represented by George Austin.

Chicago Car Heating Company, Chicago. Engine equipment for steam heating passenger cars, locomotive stop valve, locomotive pressure reducing valve, locomotive steam gages, hose coupler with positive lock. Represented by E. A. Schrieber, E. E. Smith and C. B. Benson.

Commercial Acetylene Company, New York. Acetylene headlights and equipment. Represented by J. E. Durand.

Crane Company, The, Chicago. Locomotive safety valves, locomotive blow-off and ash-pan valves, complete line of locomotive regrinding cab valves, extra heavy valves for locomotive and power plant service; also full line of railway unions, and union ells and tees for air brake equipment. Represented by F. D. Fenn and G. S. Turner.

Dearborn Drug & Chemical Works, Chicago. Water treatment for locomotives and stationary engines. Represented by Robert F. Carr, J. D. Purcell, J. H. Bowen, W. S. Reid, A. W. Cooley, J. F. Roddy, C. H.

Everett, I. H. Case, C. Murry, A. W. Crouch, F. C. Fosdick, Paul T. Payne and Otto Fluegel.

Detroit Lubricator Company, Detroit, Mich. Full line locomotive lubricators illustrating the oil control valve transfer system of filling lubricator No. 42, lubricator working under atmospheric hydrostatic pressure. Represented by A. D. Homard.

Dickerson Manufacturing & Supply Company, Clinton, Ill. Two improved safety water gages for steam boilers. Represented by C. L. Dickerson and R. R. Porterfield.

Elgin Watch Company, Chicago. Elgin railway watches. Represented by Cornelius J. Wiltsie.

Emery Pneumatic Lubricator Company, St. Louis, Mo. Brake cylinder lubricant; automatic lubricator for air brake equipment. Represented by N. J. McAloney.

Franklin Railway Supply Company, Franklin, Pa. Franklin pneumatic fire-door, vertically and horizontally opening types, grate shaker, McLaughlin flexible conduit, Franklin driving box lubricator, Franklin flexible metallic roof. Represented by W. L. Allison, R. G. Coburn, W. H. Coyle and Joseph Sinkler.

Galena Signal Oil Company, Franklin, Pa. Apparatus to show behavior of valves and cylinder oils in saturated and superheated steam at various temperatures in actual practice. Represented by P. H. Stack, W. Brumble, J. Graham, C. B. Royal, W. W. Lemon, L. H. Palmer, J. Eubank, M. M. Meham, L. Gleason, Robert McVicker, Edward McVicker, J. S. Brown, J. Linthen, W. J. Vance, J. Ferguson, J. A. Roosevelt, E. W. Hayes, J. A. Haher, R. E. Webb, George Barnes, Dr. P. H. Conradson, B. P. Corey, William Walsh and William Holmes.

Garlock Packing Company, Palmyra, N. Y. Complete line of the company's products, showing throttle valve and air pump packing; ring, spiral and coil packings for stationary power engines and for general use; sheet packing; special gaskets. Represented by J. P. Landreth, M. E. Hamilton and Phil Arnold.

Green-Tweed Company, New York. Palmetto and Manhattan packings, favorite reversible ratchet wrench and throttle packing. Represented by F. E. Ransley.

Hammett, G. H., Troy, N. Y. Showing Trojan metallic packing, Trojan bell ringers, triple valve bushing. Represented by E. C. Sawyer.

Hobart-Allfree Company, Chicago. Photographs and literature showing the Allfree locomotive valve gear. Represented by E. H. Allfree and W. H. England.

Hunt-Spiller Manufacturing Corporation, Boston, Mass. Gun iron for locomotive castings, cylinder packing and valve packing for saturated and superheated engines, rod bushings, cross-head shoes, eccentric and straps, air pump bushing and knuckle joint bushing. Represented by J. G. Platt and V. W. Ellet.

Interlocking Nut and Bolt Company, Pittsburgh, Pa. Samples of bolts for track, locomotives, cars, automobiles and block signals. Represented by R. A. Clark.

Jacobs-Shupert Firebox Company, New York. Working model one-tenth size of Jacobs-Shupert sectional firebox, also ruptured segment removed from Santa Fe engine, type 3000, which went through case of low water, proving firebox could not be blown up; cross section full size of firebox. Represented by A. W. Whiteford.

Jenkins Bros., New York. J. B. Globe angle and check valves, special features of standard and extra heavy valves, Overland sheet packing, medium and extra heavy gate valves. Represented by B. J. Neeley.

Johns-Mansville Company, H. W., New York. Samples of packing and J.-M. air brake cylinder packing expanding ring. Represented by J. C. Younglove.

Leslie Company, The, Lyndhurst, N. J. Leslie steam heat regulator, Leslie electric headlight pressure regulator. Represented by S. Inglis Leslie and J. J. Cizek.

Liberty Manufacturing Company, Pittsburgh, Pa. Twin strainer for suction water lines, tube cleaners for stationary boilers and locomotive arch tubes, combined tube cutters and expanders. Represented by W. M. Burns.

Locomotive Improvement Company, Clinton, Iowa. Markels removable driving box brass, lateral motion plates, flangeless shoes and wedges, solid head back end main rod. Represented by L. W. Barker.

Locomotive Superheater Company, New York. Type A top header superheater. Represented by Geo. L. Bourne, W. G. Lawse, W. A. Buckbee, R. Osterman, H. B. Oatley and S. Hoffman.

McCord & Company, Chicago. Three-feed force-feed lubricator in operation, one-feed pumping against more than 1,000 lbs. pressure, one-feed lubricating a standard driving box, showing process of actually lifting box off journal and making it run in oil. Represented by R. L. McIntosh and W. J. Schlacks.

Manning, Maxwell & Moore, New York. Injectors, pop valves, steam gages, Hancock oil cups, boiler check valves, automatic cylinder cocks, prismatic water gages. Represented by Joseph H. Bush and C. L. Brown.

Marshall & Huschart Machinery Company, Chicago. Photographs of railway machine shop tools; descriptive literature and catalogs. Represented by N. W. Jones.

Mason Regulator Company, Boston, Mass. Regulating valves. Represented by Frank M. Morrison.

Midwestern Car Supply Company, Chicago. Anderson draft gear, full size and models. Represented by D. D. Ward.

Moon Manufacturing Company, Chicago. Electric headlight in operation; Moon turbine generator; Peerless arc headlight. Represented by H. E. Procunier and W. L. Procunier.

Nathan Manufacturing Company, New York. Injectors, lubricators, pop-valves, water testers, Kellogg water alarm, clinger reflex water gages, boiler checks. Represented by C. A. Nathan, J. S. Seeley and George Royal.

National Boiler Washer Company, Chicago. Photographs of the various plants installed in the United States and Canada, and a description of the national low duty vacuum steam heating system. Represented by E. P. White, B. A. Brown and W. White.

New York Air Brake Company, New York. Sections of locomotive tender brakes, K. 5 and J. triple valves. Represented by B. Pratt, L. W. Sawyer, Geo. Kleipges, F. Wentworth and B. Parker.

Ohio Injector Company, Chicago. Samples of Chicago lubricator and Ohio lifting injectors, Chicago non-lifting injectors, Chicago flange oilers. Represented by F. W. Furry, F. W. Edwards, W. S. Furry and A. C. Beckwith.

O'Malley-Beare Valve Company, Chicago. O'Malley-Beare multi-plate valves, gage cocks, Duplex blow-out valves. Represented by E. O'Malley, Thomas O'Malley and H. A. Crews.

Parkesburg Iron Company, Parkesburg, Pa. Charcoal iron boiler tubes; specimens of tubes showing various tests; photographs, etc. Represented by George Thomas, L. P. Mercer and J. H. Smythe.

Parsons Engineering Company, Wilmington, Del. System of improved combustion for locomotives, eliminating smoke and saving coal. Represented by Wm. H. Savery.

Paxton-Mitchell Company, Omaha, Neb. Metallic packing for piston rods and valves, steam and air pumps. Represented by C. A. Coons.

Pilliod Brothers Company, Toledo, Ohio. Working model of the Pilliod valve gear. Represented by Charles J. Pilliod.

Pilliod Company, The, Swanton, Ohio. Working model showing the Baker valve gear. Represented by Burton W. Mudge, Herbert Green, F. S. Wilcoxson and K. J. Eklund.

Pyle National Electric Headlight Company, Chicago. Locomotive electric headlights. Represented by J. W. Johnson, J. E. Kilker and H. P. Bayley.

Railway Age Gazette, New York. Copies of *Railway Age Gazette*, the Locomotive Dictionary, Railway Shop Kinks. Represented by L. B. Sherman, Samuel O. Dunn, Roy V. Wright, John N. Reynolds, Kenneth G. Cloud and Stanley Deacon.

Railway and Locomotive Engineering, Chicago. Copies of paper. Represented by Angus Sinclair and J. A. Cassell.

Railway List Company, Chicago. Copies of the *Master Mechanic* and *Official List of Railway Officials*. Represented my William E. McGraw.

Ryan & Johnson, Chicago. Models of coal passers and automatic slack adjusting drawbar between engine and tender. Represented by Y. J. Merriman, Edward Ryan, L. W. Galloway and Oscar Johnson.

Sargent Company, The, Chicago. Safety water gages and lubricator protectors, Osborne valves and high pressure joints, also E. S. E. blow-off valves. Represented by George Sargent and F. G. Dunbar.

Storrs Mica Company, Owego, N. Y. Samples mica lantern globes in ruby and white, samples mica headlight chimneys. Represented by Charles P. Storrs.

Street, Clement F., Schenectady, N. Y. Literature describing Street locomotive stoker. Represented by Clement F. Street and M. M. Lower.

Strong, Carlisle & Hammond, Cleveland, Ohio. Samples of Randall's graphite sheet lubricator; car brasses fitted with same. Represented by B. E. Carpenter, W. P. Thacher and W. P. Owens.

U. S. Metallic Packing Company, Philadelphia, Pa. Models of King packing for locomotive piston rods, valve stems and air pumps, air pump packing, lubricating device, Golmar bell ringer, oil cups, Leach sanders, Represented by Morris B. Brewster and E. Curtiss.

Watson-Stillman Company, New York. Full-sized working sectional model of Chambers throttle valve. Represented by Frank H. Clark.

Westinghouse Air Brake Company, Pittsburgh, Pa. Working demonstration of the centrifugal dirt collector, which takes the place of the brake pipe air strainer; educational charts showing No. 6 E T locomotive and tender brake equipment; improved K air brake triple valve; improved L passenger air brake triple valve; 8½-in. Cross compound air compressor. Represented by L. M. Carlton, F. B. Farmer, C. J. Olmsted, E. Hardenstein, S. J. Kidder, F. B. Johnson, C. C. Farmer, Lawrence Wilcox, C. H. Beck, J. A. O'Malley, F. H. Parke and W. M. Sleet.

Winslow Company, Horace L., Chicago. Blow-off valves, gages, Clark blow-off system for locomotives; circulars. Represented by Horace L. Winslow and T. H. Price.

International Railway General Foremen's Association.

The executive committee of the International Railway General Foremen's Association has outlined the following subjects for discussion at next year's convention: "How Can Shop Foremen Best Promote Efficiency?" to be presented by William G. Reyer, general foreman, Nashville, Chattanooga & St. Louis, Nashville, Tenn. (this will be a continuation of the paper presented at the convention in 1910); "Shop Supervision and Local Conditions," to be presented by W. W. Scott, general foreman, Cincinnati, Hamilton & Dayton, Indianapolis, Ind.; "Shop Specialization, Work and Tools," by W. T. Gale, demonstrator, Chicago & Northwestern, Chicago; "Roundhouse Efficiency," by William Hall, shop foreman, Chicago & Northwestern, Escanaba, Mich. L. H. Bryan, Duluth & Iron Range, Two Harbors, Minn., is secretary of the association.

American Peat Society.

The fifth annual meeting of the American Peat Society will be held at the American House, Kalamazoo, Mich., September 21-23. Reports will be made by Canadian officials on the commercial results of government fuel plants and peat gas producers in Canada. Papers will be presented on the drainage of peat bogs, on peat as fuel, peat gas and by-products, peat powder as a power factor, and various other products. Julius Bordollo, Kingsbridge, N. Y., is secretary.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass.

American Association of Demurrage Officers.—A. G. Thomason, Scranton, Pa.

American Association of General Passenger and Ticket Agents.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn., Sept. 19, 1911.

American Association of Freight Agents.—R. O. Wells, East St. Louis, Ill.

American Association of Railroad Superintendents.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September.

American Electric Railway Association.—H. C. Donecker, 29 W. 39th St., New York; October 9-13, Atlantic City, N. J.

American Railway Association.—W. F. Allen, 75 Church St., New York; November 15, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 17-19, 1911, St. Louis, Mo.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, Monadnock Block, Chicago; annual convention, March 19-21, 1912, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haner, 13 Park Row, New York; 3d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; annual, June 26, 1912, Quebec, Que.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; annual convention, May 22, 1912, Los Angeles, Cal.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago; annual, November 6-10, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; annual, June 24, 1912, New York.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York; December 12-13, Louisville, Ky.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLead, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul, Minn.; 2d Monday, except June, July and Aug., St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.; annual Buffalo, N. Y.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio.

IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August, Des Moines.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION, OF UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.; Sept. 12-15, 1911, Atlantic City, N. J.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILWAY CLUB.—C. L. Kennedy, C., M. & St. P., Duluth, Minn; 4th Saturday, Duluth.

OMAHA RAILWAY CLUB.—H. H. Maulick, Barker Block, Omaha, Neb.; second Wednesday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY CLUB OF PITTSBURGH.—C. W. Alleman, P. & L. E., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; annual, May 12, 1912, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.; annual, Oct. 10, Colorado Springs, Colo.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U Ry., Peoria, Ill.; September 12-15, St. Louis, Mo.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago; Sept. 12-14, St. Paul, Minn.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.; annual, October 20, Atlanta, Ga.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March. May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—T. J. Walters, Oliver building, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 18, 1912, Louisville, Ky.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Wednesday in month except July and August, Chicago.

WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, First National Bank bldg., Chicago; annual, January 16-18, Chicago.

Traffic News.

At New Orleans, according to the *Picayune,* there is actually a serious shortage of freight cars.

The Southern Pacific now runs steamers twice each way daily between San Francisco, Cal., and Sacramento, on the Sacramento river.

The Long Island Railroad announces its fall time-table to go into effect September 8, but also announces that the fast summer trains from New York to the more important seashore resorts will be kept running until the middle of October.

It is expected that by September 6 the Illinois Railway Commission will have reached a decision in the express rate case, and that it will issue an order making reductions of from 20 to 25 per cent. in the express companies' charges in that state.

The Southern Railway, which is running a "Road improvement train" in Georgia, has announced a schedule by which the train will keep up its travel until the end of October, visiting all important sections of the southern part of the state. A few days will be spent in the northern part of Florida.

Announcement has been made by the San Pedro, Los Angeles & Salt Lake and the Southern Pacific that on all transcontinental freight to points between the Los Angeles and San Pedro terminals of these lines, they will make terminal rates, that is, the same rates as they now make on transcontinental freight to Los Angeles and San Pedro.

The Pennsylvania has announced reductions in season tickets from points in New Jersey to New York City, in compliance with the recent order of the Interstate Commerce Commission. None of the changes apply to the Pennsylvania station in Manhattan, but only to the downtown or ferry terminals. Between Newark and New York, 9 miles, monthly tickets are reduced from $6 to $5.65. From New Brunswick the rate is reduced from $12 to $10. It is expected that in accordance with the terms of the order of the commission, the Erie, the Lackawanna and the New York Central (West Shore) will soon have to make similar reductions.

The industrial department of the Terminal Railroad Association of St. Louis has sent out a booklet for general distribution, calling attention to the advantages offered by St. Louis, in the way of cheap fuel and railway facilities, to those seeking desirable factory sites. As an index of the growth of the city during the ten years from 1900 to 1910, it is noted that bank clearings increased from $1,688,849,494 to $3,727,949,379; that the total inbound and outbound freight increased from 25,313,330 tons to 51,918,100 tons, and that, according to government reports, the value of the city's factory products increased from $193,733,000 to $327,676,000.

The Atchison, Topeka & Santa Fe announces that on December 1 it will put on a new fast, "extra-fare" train, the "Santa Fe-de-Luxe," to run between Chicago and Los Angeles, Cal. The extra fare on this train, which will be run once a week during the winter between Chicago and Los Angeles, via Kansas City and Albuquerque, will be $25, and it will be the first "extra fare" train to be run to California. Westbound it will leave Chicago at 8 p. m., Kansas City at 8 o'clock the following morning and arrive at Los Angeles at 9 a. m. of the third morning. Eastbound it will leave Los Angeles at 6 p. m., arrive in Kansas City at 11 p. m. of the second day and reach Chicago at 11 a. m. the third morning. It will make the trip to Los Angeles from Chicago in 63 hours, and from Kansas City in 51 hours. This will reduce by 5 hours and 30 minutes the fastest present schedule from Chicago to Los Angeles, and by 7 hours and 45 minutes, the fastest schedule from Los Angeles to Chicago. The new train will have compartment, drawing-room and observation sleeping cars, a club car and a dining car, all new cars, and will carry a barber, a ladies' maid and stenographer. The cars are all steel underframe with wood interior. Bathing facilities will be provided, and market reports and daily bulletins of important events will be telegraphed to the train en route. New cars will also be built for the "California Limited," which will continue on its present schedule.

Cotton Bills of Lading Bureau.

The Liverpool Cotton Merchants' Committee, following discussions and negotiations extending over many months, has established a bureau in New York City to receive and record bills of lading for cotton shipped to Europe. The office of the bureau will be at 51 Wall street, and the manager will be Charles E. Mather, an insurance agent. The office begins operations September 1. This bureau is established for the purpose of guarding against fraud in the issuance of bills of lading and to reassure English consignees who suffered severe losses last year by the issuance of bills of lading when no cotton was shipped. It is said that the principal railways of the Southern States have agreed to send copies of bills of lading to the Bureau and to co-operate with it. There was some objection, on the ground that shippers' rights would be infringed, but the objections seem to have been overcome.

The railways have promulgated strict regulations for the guidance of agents in the making of bills of lading. Every such bill must have the autograph signature of the agent. Copies must be marked "Copy—not negotiable." One copy is to be sent to the steamship agent and one to the bureau in New York. The original bill of lading must be filled out with pen and ink and must be free from additions, erasures or changes. On every bill of lading there will be pasted a certificate from some officer of the railway company that the signature of the station agent is genuine. These certificates are to be numbered and guarded the same as tickets or other valuable papers.

The New York *Journal of Commerce* finds large numbers of banks in New York City which intend to ignore the bureau, some of these being banks which are represented on the committee of the American Bankers' Association, which approved the plan.

Car Surpluses and Shortages.

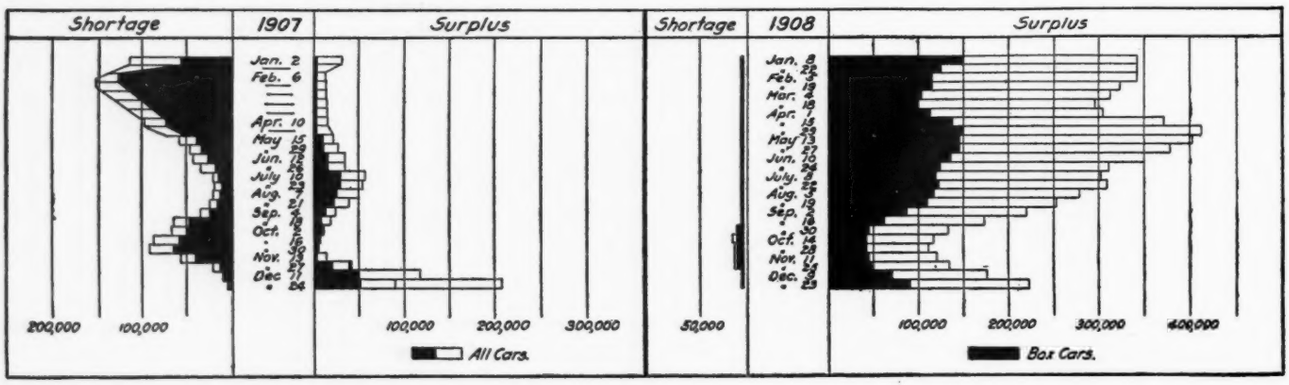
Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 101-A, giving a summary of shortages and surpluses by groups from April 27, 1910, to August 16, 1911, says:

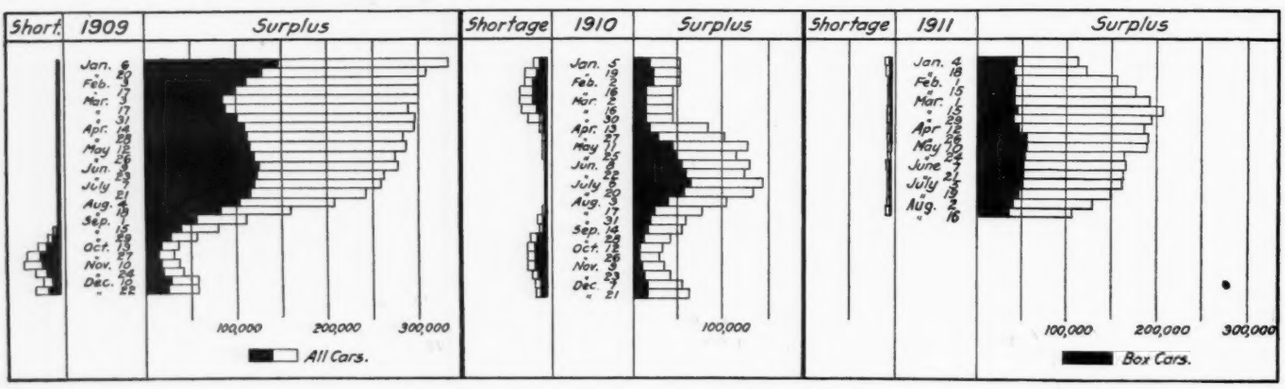
"There is a decrease in the surplus of all classes, the total decrease being 22,136 cars, bringing the total surplus down to 108,000, the lowest figure since the report for December 21, 1910. The decrease is principally in coal cars in Group 3 (middle), although box cars show a reduction of 5,692, principally in Group 3 (middle), and Group 8 (middle western),

CAR SURPLUSES AND SHORTAGES.

Date.	No. of roads.	Surpluses					Shortages				
		Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—August 16, 1911	7	1,323	607	1,882	308	4,120	0	146	307	0	453
" 2.— " 16, 1911	25	2,499	53	3,818	3,096	9,466	15	13	826	0	854
" 3.— " 16, 1911	26	2,837	375	17,597	3,862	24,671	67	1	0	26	94
" 4.— " 16, 1911	10	1,258	137	521	1,291	3,207	65	13	300	60	438
" 5.— " 16, 1911	19	3,047	297	2,494	1,756	7,594	90	22	421	0	533
" 6.— " 16, 1911	24	13,302	767	2,689	6,556	23,314	15	0	2	8	25
" 7.— " 16, 1911	3	1,237	61	727	698	2,723	0	0	0	0	0
" 8.— " 16, 1911	17	4,309	817	1,992	4,005	11,123	0	0	0	0	0
" 9.— " 16, 1911	11	1,356	145	288	517	2,306	0	0	0	0	0
" 10.— " 16, 1911	19	5,809	787	2,164	9,628	18,388	74	0	10	0	84
" 11.— " 16, 1911	5	935	115	18	20	1,088	993	222	0	134	1,349
Total	166	37,912	4,161	34,190	31,737	108,000	1,319	417	1,866	228	3,830

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.





Car Surpluses and Shortages in 1907 to 1911.

and miscellaneous cars 1,257. Car shortage shows a slight increase, the total being 3,830."

The accompanying table gives surpluses and shortages by groups in the last period covered by the report and the chart shows total bi-weekly figures in 1907 to 1911.

INTERSTATE COMMERCE COMMISSION.

The Commission has issued a notice, suspending until December 29, a proposed advance in rates on staves and other articles on the Missouri Pacific and the St. Louis Iron Mountain & Southern. The Commission also suspended until December 29 a proposed advance in rates on milk over the Delaware & Hudson.

STATE COMMISSIONS.

R. A. Thompson, hitherto chief engineer of the Wichita Falls & Northwestern, Wichita Falls, Tex., has been appointed engineer of the California State Railway Commission. Mr. Thompson was formerly for nine years engineer of the Texas Railway Commission.

The Public Utilities Commission of Kansas has complained to the Interstate Commerce Commission of the readjustment of freight rates from eastern cities recently ordered by the federal commission. It is charged that the change in these rates between the Mississippi river and the Missouri has given an undue preference to the commercial centers on the Missouri river, to the disadvantage of towns in Kansas.

The Indiana commission, in its decision refusing to allow the railways to raise from 25 cents to 35 cents their minimum charge for a freight shipment, gave as its principal reasons the absence of evidence to show that the lower rate is not remunerative, and that a great hardship would be worked on the small merchant. One shipper of drugs presented evidence that he sent by freight 900 shipments a month of such light weight as to be affected by the proposed increase. Shippers of bread and confectionery made similar claims.

COURT NEWS.

The Louisville & Nashville has appealed to the Commerce Court from the decision of the Interstate Commerce Commission, which put a stop to the rebilling at Nashville of grain from the northwest to southeastern states. The Nashville board of trade and the Nashville Grain Exchange join in the appeal. Over 2,000,000 bushels of grain are now stored in Nashville elevators awaiting reshipment to southeastern points.

Judge R. E. Lewis of the Federal Court at Denver, Colo., has given an opinion as to what should be considered to be adjacent lands to the Denver & Rio Grande, in a case brought by the government and pending for several years against that road and several other small railways and lumber companies. Under an agreement with the government, made in 1872, the Denver & Rio Grande acquired a strip of land wide enough for five track lines, on condition that it would push its road through to Santa Fé within the next five years, and a clause in this agreement gave the road the right to cut and use timber from the public lands adjoining its right-of-way. An extension of time was afterward given to the road, and subsequent agreements made between the Rio Grande and other large roads in that territory prevented the construction of the line to Santa Fé. The object of the suit brought by the government was to determine how far distant from its right-of-way the road was privileged to take timber for its use, it having been found that at times during construction it had taken it from points as much as 19 miles distant; and the present effectiveness of the grant itself was questioned, in view of the fact that the road was never completed as agreed. Judge Lewis decided that a strip three miles in width on each side of the right-of-way was the only land from which timber could be taken by the road. He also held, with the railway, that agreements made by it with other roads had no bearing on the matter. Decisions on several of the ten questions in equity discussed in the suit were favorable to the railway.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

C. S. Albert has been appointed attorney for the Great Northern, with office at Spokane, Wash., succeeding L. F. Chester, resigned.

A. A. Maxwell, commissioner of the real estate department of the New York, New Haven & Hartford, at New Haven, Conn., has been appointed also in charge of the real estate department of the Boston & Maine, with office at Boston, Mass.

Henry G. Herbel, interstate commerce attorney of the Missouri Pacific-Iron Mountain System, at St. Louis, Mo., has been appointed also interstate commerce attorney of the Texas & Pacific and the International & Great Northern, with office at St. Louis.

Sir William Whyte, vice-president of the Canadian Pacific at Winnipeg, Man., is to be retired on account of advanced age on September 30, and will at that time be elected a director. G. Bury, general manager at Winnipeg, is to succeed Sir William as vice-president.

S. W. Tracy, superintendent of car service of the Chicago, Indiana & Southern, and the Indiana Harbor Belt, at Gibson, Lake county, Ind., has been appointed auditor of the Indiana Harbor Belt, with office at Gibson, succeeding G. M. Glazier, who had his office at Cleveland, Ohio.

The general offices of the Tonopah & Tidewater Company, the Tonopah & Tidewater Railroad Company, and the Bullfrog Goldfield Railroad Company, consisting of the traffic, auditing, car accounting and local treasury departments, were transferred on September 1, from Los Angeles, Cal., to Oakland, Cal.

Operating Officers.

W. C. Ashcraft, trainmaster of the Atchison, Topeka & Santa Fe at Pueblo, Colo., has been transferred to Dodge City, Kan., succeeding J. D. Coffey, and G. W. Thompson succeeds Mr. Ashcraft.

G. T. Rooke has been appointed inspector of transportation of the Canadian Pacific; and J. B. Smith has been appointed assistant inspector of transportation; both with offices at Montreal, Que.

J. F. Russ, superintendent of the Northern Kansas division of the Missouri Pacific at Atchison, Kan., has been appointed superintendent of the Omaha division, with office at Falls City, Neb., succeeding A. De Bernardi, promoted. R. G. Carden, trainmaster at Jefferson City, Mo., succeeds Mr. Russ.

W. B. Cronk has been appointed superintendent of the Grand Trunk Pacific, with jurisdiction over the Melville-Regina, Regina-Boundary and Regina-Moose Jaw lines, with office at Regina, Sask., and I. A. MacPherson has been appointed assistant to general superintendent, with office at Winnipeg, Man., succeeding R. D. Thomas.

Albert De Bernardi, who has been appointed general superintendent of the Missouri Pacific, with office at Kansas City, Mo., as has been announced in these columns, was born in 1865 at Independence, Mo. He received a common school education, and began railway work in 1882 with the Missouri Pacific as a track laborer. He was then consecutively, from 1885 to 1893, section foreman, foreman of an extra gang, brakeman and foreman of a construction train. He was appointed division roadmaster at Nevada, Mo., in 1893, where he remained for six years, being promoted at the same place to trainmaster in 1899. In 1900 he was appointed divsion superintendent of the Central branch at Concordia, Mo., and a year later was transferred to Osawatomie, Kan., where he remained for four years. He was then appointed general superintendent of the General district at Coffeyville, Kan., and the next year was transferred to the Southern district at Little Rock, Ark. In March, 1908, when the Central district was abolished and other changes were made in the operating organization, he was appointed superintendent of the Omaha and North Kansas divisions, with office at Atchi-

son, Kan., from which position he has just been promoted to general superintendent of the Western district, as above.

The Hine system of organization has been extended to include the Southern Pacific Railroad of Mexico, the Sonora Railway and the Arizona Eastern Railroad. R. H. Ingram, general manager of the Southern Pacific Railroad Company of Mexico, and assistant general manager of the Sonora Railway, at Empalme, Sonora, Mex., L. H. Long, chief engineer of both the above companies and assistant chief engineer of the Arizona Eastern at Tucson, Ariz., P. J. Archer, assistant treasurer and purchasing agent of the Southern Pacific of Mexico, purchasing agent and cashier of the Sonora Railway, and treasurer and purchasing agent of the Arizona Eastern, at Tucson, Ariz., and J. C. McClure, engineer maintenance of way of the Arizona Eastern at Tucson, Ariz., will hereafter be designated as assistant general managers. All will be assistants to Vice-president and General Manager Epes Randolph, with headquarters at Tucson, Ariz. They will continue in charge of the duties heretofore devolving upon them, and in addition assume such other duties as may be assigned to them. H. J. Temple, superintendent of the Southern Pacific Railway Company of Mexico and the Sonora Railway at Empalme, Sonora, Mex., has been appointed general superintendent of the lines in Mexico with headquarters at Empalme. M. J. Kingsbury, assistant superintendent at Empalme, succeeds Mr. Temple. E. N. Brown, superintendent of the Sinaloa division of the Southern Pacific Railway Company of Mexico at Mazatlan, and J. B. Finley, general storekeeper of the Southern Pacific of Mexico and the Sonora Railway at Empalme, have been appointed assistant general superintendents of these two companies, with office at Empalme. J. W. Williams succeeds Mr. Brown, and F. Thomas has been appointed chief special agent with office at Empalme. See item under Engineering and Rolling Stock Officers.

Traffic Officers.

H. Bromley, general coal and ore agent of the New York Central Lines, west of Buffalo, at Cleveland, Ohio, has been retired under the pension rules of the company.

J. A. Martin, assistant general eastern agent of the Chicago, Burlington & Quincy, at New York, has been appointed general agent, freight department, with office at New York.

H. B. Sperry, commercial agent of the Fort Worth & Denver City at Fort Worth, Tex., has been appointed general freight and passenger agent of the Texas Central, with office at Waco, Tex.

L. L. Tanner, ticket agent of the Chicago, Burlington & Quincy, at Chillocothe, Mo., has been appointed traveling passenger agent, with office at Cincinnati, Ohio, suceeding J. V. Clayman resigned to engage in other business.

J. H. Andrews has been appointed a commercial agent of the Southern Railway, with office at Raleigh, N. C., and H. B. Rogers has been appointed a soliciting agent, with office at Norfolk, Va., succeeding William J. Oliver, resigned to go to another company.

J. W. Bennett has been appointed commercial agent of the Missouri & North Arkansas, with office at Helena, Ark., succeeding L. A. Patterson, promoted, and L. D. Bell has been appointed traveling freight agent, with headquarters at Eureka Springs, Ark.

H. E. Schlerf, traveling freight agent of the Chicago, Indianapolis & Louisville, at Milwaukee, Wis., has been appointed commercial agent, with office at Milwaukee, succeeding R. B. Robertson, resigned to accept service with another company. F. W. Ludwig succeeds Mr. Schlerf.

C. F. Norton, commercial agent of the Trinity & Brazos Valley, of Corsicana, Texas, has been appointed commercial agent, with office at Fort Worth, Texas, succeeding W. A. Scrivner, resigned. K. W. Shedd, traveling freight agent at Forth Worth, has been appointed commercial agent, with office at Oklahoma City, Okla.

F. D. Burroughs, assistant general freight agent of the Chicago, Milwaukee & Puget Sound, the Gallatin Valley, the Idaho & Western and the Tacoma Eastern at Seattle, Wash., has been appointed general freight agent, with office at Seattle, and J. R. Veitch, district freight and passenger agent at Portland, Ore., succeeds Mr. Burroughs.

James Fitzsimons, general agent freight department of the Delaware & Hudson at Chicago, has been promoted to general eastern freight agent at Albany, N. Y., succeeding H. C. McCullough, deceased. G. I. Israel, traveling freight agent at Buffalo, N. Y., succeeds Mr. Fitzsimons, and O. R. Eytel, traveling freight agent at Pittsburgh, succeeds Mr. Israel. C. N. Bartel, succeeds Mr. Eytel.

Incident to the reorganization of the freight soliciting forces of the Chicago agency of the Delaware, Lackawanna & Western, the following appointments have been made: A. S. Hindman, eastbound freight agent; R. F. Locke, westbound freight agent; H. L. Cole, traveling freight agent, and C. H. Drinkwater, contracting freight agent. T. J. McGeoy, assistant general western freight agent, will have supervision over the solicitation of business, reporting to the general western freight agent.

C. S. Wight, general traffic manager of the Baltimore & Ohio at Baltimore, Md., has been appointed general freight traffic manager, with office at Baltimore, and O. P. McCarty, general passenger agent of the Baltimore & Ohio Southwestern, and the Cincinnati, Hamilton & Dayton at Cincinnati, Ohio, has been appointed passenger traffic manager of the Baltimore & Ohio, succeeding to part of the duties of Mr. Wight. W. B. Calloway, assistant general passenger agent at Cincinnati, succeeds Mr. McCarty, and W. G. Brown, assistant to the general passenger agent, succeeds Mr. Calloway. C. W. Bassett, general passenger agent of the Baltimore & Ohio at Baltimore, Md., has been appointed assistant to the passenger traffic manager, with office at Baltimore. George W. Squiggins, assistant general passenger agent, succeeds Mr. Bassett, and his former position has been abolished.

W. M. Kirkpatrick, general freight agent of the Canadian Pacific at Montreal, Que., has been appointed assistant freight traffic manager, in charge of eastern lines, with office at Montreal, succeeding W. B. Bulling, who has retired temporarily from active service on account of ill health. H. E. Macdonell, division freight agent at Montreal, succeeds Mr. Kirkpatrick, and E. N. Todd, export freight agent, succeeds Mr. Macdonell. In addition to the above offices, the organization of the freight traffic department of the eastern lines includes the following officials: W. B. Bamford, division freight agent, Atlantic division, St. John, N. B.; H. A. Plow, district freight agent, Eastern division, Ottawa, Ont. On the Ontario division M. H. Brown, division freight agent, Toronto; J. H. Griffin, district freight agent, Toronto; W. J. Grant, district freight agent, Hamilton, Ont., and L. Mulkern, district freight agent, London, Ont.; W. S. Elliott, is division freight agent of the Lake Superior division, at North Bay, Ont.

Oren M. Ellsworth, whose appointment as general eastern freight agent of the Rock Island Lines, with office at New York City, has been announced in these columns, was born at Bayfield, Ont., and was educated at the Collegiate Institute, Peterboro, and at the college at Toronto. He began railway work in October, 1886, in the freight auditor's office of the Chicago, Rock Island & Pacific, and then went to the Frisco Lines, where he remainder about four years. He was then traveling auditor and agent for four years on the St. Louis, Iron Mountain & Southern. His next position was on the Chicago, Oklahoma & Gulf. He has been connected with the freight traffic department of the Rock Island Lines since that company took over the C. O. & G., as traveling freight agent, commercial agent, and for the past six years as general agent at Pittsburgh, which position he held at the time of his recent appointment as general eastern freight agent. Mr. Ellsworth was also for four years a member of the board of governors, and for one year chairman of the board of the Pittsburgh Traffic Club, and later was president of that organization.

Engineering and Rolling Stock Officers.

See an item under State Commissions regarding the Wichita Falls & Northwestern.

J. Beaumont has been appointed signal engineer of the Chicago Great Western, with office at Chicago.

B. Herman, principal assistant engineer of the Southern Railway at Washington, D. C., has been appointed chief engineer maintenance of way and structures of the Southern Railway, the Northern Alabama and the Virginia & Southwestern, with office at Washington.

Walter H. Donely, whose appointment as master mechanic of the Illinois Central, with office at East St. Louis, Ill., has been announced in these columns, was born July 10, 1876, at Champaign, Ill. He received a high school education, and began railway work in June, 1891, as a call boy on the Illinois Central. For three and one-half years from January, 1893, he was a machinist apprentice, after which he worked as a journeyman until 1898. He was then promoted to roundhouse foreman, which position he held until February 1, 1907. From the latter date until the time of his promotion as above, he was general foreman, with office at Champaign.

H. Weitzel, superintendent of shops of the Southern Pacific Railroad Company of Mexico, at Empalme, Sonora, Mex., has been appointed master mechanic of the Empalme general shops of the Southern Pacific of Mexico and the Sonora Railway, and his former position has been abolished. Under the Hine system the head of a general shop detached from an operating division is called master mechanic, while mechanical officers with road jurisdiction have the title assistant superintendent, assistant general superintendent, or assistant general manager as the case may be. The head of a division shop is called general foreman. The Hine system, for over two years past in operation on the divisions of the lines mentioned, now covers five general offices and twenty-five operating divisions of the Harriman lines. See item under Operating Officers.

Joseph J. Shaw, whose appointment as master mechanic of the St. Louis & San Francisco, with office at Enid, Okla., has been announced in these columns, was born November 2, 1869, at Amboy. Ill. He received a high school education, and began railway work in October, 1886, as a machinist apprentice with the Illinois Central at Amboy. He was then consecutively machinist for the Chicago & Alton at Bloomington, Ill.; for the Illinois Central at Freeport, Ill.; and for the Baltimore & Ohio at South Chicago, Ill. He went with the St. Louis & San Francisco at Fort Smith, Ark., in February, 1897, as a machinist, and in 1903 was appointed division foreman, with office at Sapulpa, Okla. He was later transferred with the same title to Neodosha, Kan., and then to Enid, Okla., which position he held at the time of his recent appointment as master mechanic.

Joseph J. Shaw.

Purchasing Officers.

W. S. Atkinson has been appointed purchasing agent of the Kansas City Southern, with office at Kansas City, Mo., succeeding L. F. Jordan, resigned to go to another company. R. G. Lowry, general storekeeper at Pittsburg, Kan., will hereafter report to the vice-president and general manager.

Special Officers.

Victor J. Bradley, superintendent of the second division of the United States Railway Mail Service with headquarters at New York City, has resigned, to become mail agent of the Pennsylvania Railroad. E. M. Norris, hitherto in charge of the Cincinnati division of post office inspectors, succeeds Mr. Bradley in the Railway Mail Service.

OBITUARY.

Thomas T. Morford, formerly manager of the Union Steamboat Line and Lehigh Valley Transportation Company, and later general agent for the Erie Railroad, died on August 28, at his home in Buffalo, N. Y., at the age of 73.

Walter Oakes, formerly engaged in railway work in the West, and later general manager of the steamship lines of the Northern Pacific Railroad Company at Tacoma, Wash., and president of the Alaska Steamship Company, died on August 24, in Seattle, Wash., at the age of 46 years. Mr. Oakes was the son of T. F. Oakes, formerly—1888-1893—president of the Northern Pacific.

John Bowdish Dutcher, formerly and for many years until 1910, livestock agent of the New York Central, and also a director of the New York & Harlem, died at his home at Pawling, N. Y., on August 27, at the age of 75 years. Mr. Dutcher had been connected with the Harlem since 1864 and with the New York Central since its organization. He had been a member of the Union League and Transportation Clubs and the St. Nicholas Society of New York. He had served for two years as president of the New York State Agricultural Society, and between 1861 and 1865 was a member of the state assembly and the state senate.

John S. Wilson, formerly general freight traffic agent of the Pennsylvania Railroad, died at his summer home at Bass Rocks, near Gloucester, Mass., on August 21. Mr. Wilson began railway work as a solicitor for the Baltimore & Ohio in 1862, and was general freight agent of the Philadelphia, Wilmington & Baltimore from 1870 to 1882. In 1882 that road was taken over by the Pennsylvania Railroad, and he was appointed general freight agent of the Pennsylvania. He was promoted to general freight traffic agent in July, 1885, from which position he resigned in October, 1888. Mr. Wilson was elected president of the Central New England & Western (the Poughkeepsie Bridge Route) in 1889, from which position he resigned in February, 1892, when the road became a part of the Philadelphia, Reading & New England. He was elected president of the Baltimore, Chesapeake & Atlantic in May, 1897, and remained in this position until the road was sold to the Pennsylvania in 1899.

William Dana Taylor, chief engineer of the Chicago & Alton and the Toledo, St. Louis & Western, with office at Chicago, died at Chicago on August 26. Mr. Taylor was born January 22, 1859, at Montgomery, Ala., and graduated from the Alabama Polytechnic Institute as a civil engineer in 1881. He later did post-graduate and laboratory work at Johns Hopkins and Cornell universities and at the University of Chicago, and received honorary degrees at the two last-named institutions. In 1882 and 1883 he was with the Mexican Central as topographer, transitman, resident engineer and division engineer on the construction of the Tampico branch. He was engineer of construction of the Montgomery & Florida, now part of the Atlantic Coast Line, for two years from 1886, and was then for three years successively resident engineer, engineer of construction and chief engineer of the Alabama Mineral and Birmingham Mineral lines of the Louisville & Nashville. In November, 1898, he was made chief engineer of the St. Louis, Peoria & Northern, now the Illinois Central and the Chicago & Alton, and in June, 1899, was appointed assistant engineer of the Alton, in charge of reconstruction of the Missouri river bridge and surveys for various improvements, including track elevation work at Chicago. In 1901 he made an appraisal of the physical properties of the Duluth & Iron Range and the Duluth, Missabe & Northern for the Minnesota Railroad and Warehouse Commission, and from March to October, 1902, was chief engineer on construction of the Knoxville, Lafollette & Jellico, a branch of the Louisville & Nashville. In June, 1903, was appointed engineer expert for the State Tax Commission of Wisconsin, in charge of the appraisal of the physical properties of the railways in that state. He was appointed chief engineer of the Chicago & Alton in January, 1906. Mr. Taylor held the chair of civil engineering at the University of Louisiana for seven years from 1891, and that of railway engineering at the University of Wisconsin for a number of years from 1901. In 1898 he was also appointed captain of the Third United States Engineers by President McKinley. He was a member of the Western Society of Engineers, of the American Society of Civil Engineers and of the American Railway Engineering Association.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Kansas City Southern has ordered 12 Mallet locomotives and eight Pacific type locomotives from the American Locomotive Company. This road is still in the market for 10 consolidation locomotives.

The Mobile & Ohio has ordered four mikado locomotives from the Baldwin Locomotive Works. The dimensions of the cylinders will be 27 in. x 30 in., the diameter of the driving wheels will be 63 in., and the total weight in working order will be 239,000 lbs.

The Thornton & Alexandria has ordered one consolidation locomotive from the Baldwin Locomotive Works. The dimensions of the cylinders will be 16 in. x 24 in., the diameter of the driving wheels will be 44 in., and the total weight in working order will be 100,000 lbs.

The Algoma Steel Company, Sault Ste. Marie, Mich., has ordered two six-wheel switching locomotives from the Montreal Locomotive Works. The dimensions of the cylinders will be 19 in. x 24 in., the diameter of the driving wheels will be 50 in., and the total weight in working order will be 123,000 lbs.

CAR BUILDING.

The Erie is in the market for 200 refrigerator cars and for 250 automobile cars.

The Kansas City Southern is taking prices on 12 chair cars, 9 baggage cars and 3 combination cars.

The Pennsylvania Lines West have ordered 690 gondola cars and 26 flat cars from the Pressed Steel Car Company.

The Buffalo Creek & Gauley, mentioned in the *Railway Age Gazette* of April 7 as being in the market for 100 hopper cars, has ordered this equipment from the Pressed Steel Car Company.

The Atlantic Seaboard Dispatch, mentioned in the *Railway Age Gazette* of August 4 as being in the market for 100 refrigerator cars, has ordered this equipment from the Haskel & Barker Company.

The Havana Central has ordered 185 flat cars and 100 general service gondola cars. The Standard Steel Car Company will build the flat cars, and the Pressed Steel Car Company will build the gondola cars.

The St. Louis & San Francisco, mentioned in an unconfirmed item in the *Railway Age Gazette* of August 25 as having ordered 250 flat cars from the American Car & Foundry Company, has ordered this equipment from this company.

IRON AND STEEL.

The Grand Trunk is in the market for 10,000 tons of rails.

The Boston & Maine is taking prices on 5,000 tons of bridge material.

The Chesapeake & Ohio has ordered 4,500 tons of rails from the United States Steel Corporation.

The Illinois Central has ordered 9,400 tons of open hearth rails from the Tennessee Coal, Iron & Railroad Company.

The George A. Fuller Company, Chicago, has ordered 14,000 tons of structural material for the new Kansas City Union Terminal from the American Bridge Company.

The New York Central has placed an order for 5,000 tons of structural steel with the American Bridge Company, and 1,500 tons of structural steel from the Buffalo Structural Steel Company.

General Conditions in Steel.—Men in the steel industry are satisfied with the fundamental conditions, although they admit that the intention of the railways to retrench is a disturbing feature, for under normal conditions the railways consume 40 per cent. of all the steel produced. Business in structural steel since the first of the year has even exceeded the high record made in 1906, and the Steel Corporation reports that more general business has been received so far this year than in the corresponding period of 1910.

Supply Trade News.

Alonzo C. Shults has been made general Eastern sales agent of the Bass Nut Company, Chicago, with office in the Grand Central Terminal building, New York.

W. H. Latshaw, a former vice-president of the National Tube Company, Pittsburgh, Pa., died at his home in Pittsburgh, on August 29. Mr. Latshaw was 56 years old.

R. T. Miller has been made acting manager of the Chicago office of the Pittsburgh Testing Laboratory, Pittsburgh, Pa., succeeding to the duties of James A. Lister, resigned.

The Crocker-Wheeler Company, Ampere, N. J., will on September 1 open offices in the First National Bank building, San Francisco, Cal. A supply of motors, generators and transformers of various sizes will be carried in stock for immediate coast deliveries. John S. Baker will be in charge.

James Christie, president of the Engineers' Club, Philadelphia, Pa., and vice-president of the Franklin Institute, died of apoplexy at his summer home in Atlantic City, N. J., on August 24. Mr. Christie was born in 1840, near Ottawa, Can., and was educated in the public schools of that city. After some experience in locomotive works, he spent a year in a railway engineering corps. He then worked for five years as machinist and mechanical draftsman of the I. P. Morris Company, Philadelphia, Pa. In 1865 he went to Pittsburgh, Pa., and entered the Cyclops Iron Works, which has since become the Thirty-third street mill of the Carnegie Steel Company. After 1870 he worked in several bridge companies, and in 1905 resigned his position as chief engineer of the American Bridge Company, New York, to devote his time to private business.

Walter H. Brimson, formerly general superintendent of the Baltimore & Ohio Southwestern at Cincinnati, Ohio, has been made vice-president of the Economy Separable Switch Point Company, Louisville, Ky., with headquarters in that city. Mr. Brimson has been in the railway business since 1862, starting as a messenger boy for the Cleveland & Toledo. Among the more important positions he has held are the following: Superintendent of the Duluth & Iron Range; assistant superintendent of the Pacific division of the Northern Pacific, and superintendent of the Rocky Mountain division of the same road; superintendent of the Branierd & Northern Minnesota; superintendent of the Ohio division of the Baltimore & Ohio Southwestern, and general superintendent of the same road until his recent resignation.

The Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received an order from the Cincinnati Traction Company for an equipment for a generating station and three substations, consisting of one 6,000-kva., 1,500 r. p. m., 25-cycle; 13,200-6,600 v., three-phase turbo generator, with direct connected exciter; five 1,500-kw., 25-cycle, six-phase, 600-v., direct current, 250 r. p. m., rotary converters, sixteen 500-kva., 25-cycle, 13,200-6,600 v., self-cooled transformers; also four switchboards for control of the above apparatus. This company has also received an order from the Groton & Stonington Street Railway, Mystic, Conn., for three quadruple, direct-current motors with K-6 controllers, and one from the Connecticut Valley Street Railway, Gainesville, Mass., for five quadruple, direct-current motors and a K-28-B controller. The Indianapolis Traction & Terminal Company has recently placed an order with the Westinghouse company for two direct-current motors, and the Savannah Electric Company has ordered three double-equipment, interpole railway motors with a 36-F controller from the same company.

TRADE PUBLICATIONS.

Telephones.—The Western Electric Company, Chicago, has devoted bulletin No. 1105 to the selection, installation and wiring of inter-phone systems. This bulletin was noticed in our last issue, but was erroneously credited to the General Electric Company, Schenectady, N. Y.

Railway Construction.

New Incorporations, Surveys, Etc.

CANADIAN NORTHERN.—Contracts have been let for building the last link between Winnipeg, Man., and the Pacific coast, covering a 250 mile section between Yellow Head Pass, B. C., and Kamloops. The work is to be carried out jointly by the Northern Construction Company, and the Cowan Construction Company, and is to be started at both ends at the same time. (July 28, p. 198.)

A contract is said to have been given to Rene A. Girouard, Smith's Falls, Ont., for building a section of the Canadian Northern, from Jones' Locks, Smith's Falls, to Otter Lake, 9 miles.

CHARLESTON & NORTH WESTERN.—An officer writes that contracts will be let some time next spring to build from Mt. Pleasant, S. C., northeast to McClellansville, 32 miles; Bonneau to Guerrins Bridge, 30 miles, and Cainhoy to Guerrins Bridge, 6 miles. There will be one short steel bridge, also a number of terminal stations and way stations. A. C. Tuxbury, president, Montclair, N. J.

CHICAGO, MILWAUKEE & PUGET SOUND.—An officer writes that contracts have been given to the Bates & Rogers Construction Company, for the grading work, also for constructing subways and bridges required for the construction of lines and terminals in the city of Spokane, Wash.

CHICAGO & NORTHWESTERN.—An officer writes that it is expected to have work finished this season, from Milwaukee northwest to Sparta, and that the extension from Colome, S. Dak., west to Winner, has been finished; 10.97 miles.

DENVER & RIO GRANDE.—An officer is quoted as saying that the improvements contemplated will be deferred until financial conditions are more favorable. The company is now laying about 4,000 tons of new 85-lb. rail. Double tracking work was recently completed on 10 miles west of Pueblo, Colo. The new low grade line being constructed in conjunction with the Colorado & Southern between Pueblo and Walsenburg, will cost each company about $1,900,000, and will be finished about December 1. The Salt Lake shops are being enlarged at a cost of $50,000, and considerable strengthening of the narrow gage lines is being carried out with heavy rail taken up on the main line.

EL PASO SOUTHWESTERN.—A sub-contract has been let to Blumencranz & Weyser, for bridge and culvert work on the first four miles west of Fairbanks, Ariz. MacArthur Bros. Company, New York, has the general contract to build an extension from Fairbanks to Tucson, 67 miles. (August 11, p. 304.)

GOULD SOUTHWESTERN.—An officer writes that the company expects to let contracts within ninety days for building extensions. The road is now in operation from Gould, Ark., west to Star City, 19 miles. The plans call for an extension from Gould east to Pendleton, 6 miles, and from the western terminus at Star City, southwest to Fordyce, about 33 miles. The work will involve handling 15,000 cu. yds. a mile. Maximum grade will be 7/10 per cent. Maximum curvature 4 deg. There will be one 60-ft. steel bridge and about 7,000 ft. of other bridge work. The extensions are to be built to carry lumber, cotton, merchandise, etc.

GREAT NORTHERN.—According to press reports, this company is planning to build about 200 miles of feeder lines in the eastern part of the state of Washington. A line is to be built from Republic, south along the San Poil river to Hell Gate, thence following the Columbia river to Peach, and from that point to a connection with the main line at Bluestem, about 100 miles. A line is also to be built north up the east bank of the Columbia river from Peach to Marcus—90 miles.

KNOXVILLE, SEVIERVILLE & EASTERN.—See this company under Railway Financial News.

MANATAWNEY RAILROAD.—An officer writes that this company expects to let contracts soon to build from a point near Douglassville, Pa., north to Spansville, 10 miles. The approximate fill per mile is 15,000 cu. yds., and approximate cut per mile is 10,000 cu. yds. The maximum grade will be about 1 per cent. There is to be one 125-ft. steel bridge. The company will use steam for motive power, but will also arrange for the use of electric cars on the line. It is being built to carry iron ore, limestone and miscellaneous freight and passenger traffic. M. J. Person, president, Bethlehem; S. Robinson, Jr., treasurer, and A. Lehman, chief engineer, 506 Walnut street, Philadelphia. (August 18, p. 356.)

MIDDLE TENNESSEE TRACTION COMPANY.—An officer writes that a contract has been given to McLaughlin & Co., and grading work is now under way from Franklin, Tenn., southeast to College Grove, 16 miles. The work involves handling about 10,000 cu. yds. a mile. Maximum grade will be between 2 and 3 per cent.; maximum curvature 10 deg. There will be one 50 ft. steel bridge, and probably a power house when the road has been built. P. E. Cox, president, Franklin, Tenn., John Wilkes, chief engineer, Nashville.

MISSOURI PACIFIC.—See an item in General News regarding improvements on this road.

NEW YORK, NEW HAVEN & HARTFORD.—See an iem under General News, regulating retrenchments.

PENNSYLVANIA ROADS (Electric).—Plans are being made by residents of Pittsburgh and Washington, Pa., to build an interurban line from Washington, north to West Middletown, 12 miles.

RALEIGH & CHARLESTON.—An officer writes that this company is building a mile or two of lumber roads from Marion, S. C., towards Libby.

RANDOLPH & CUMBERLAND.—An officer writes that this company, which operates an 18-mile line from Carthage, N. C., to Hallison, is building an extension towards Winston-Salem.

SANTIAGO, EL PASO & ST. LOUIS.—According to press reports, work is to be started at once on this line. The projected route is from Artesia west via Hope to El Paso, about 525 miles. The McCarthy Engineering Corporation, of Houston, Tex., has the general contract, and a sub-contract was recently let to Mahoney & McNeil for work on a 25 mile section from Artesia to Hope. It is understood that the Frisco interests are back of the project. A. Courchesne, president, El Paso, Tex., and P. A. McCarthy, chief engineer, Houston.

SOUTHERN RAILWAY & NAVIGATION COMPANY.—An officer writes that this company is building an extension from Cooksville, La., southwest towards Alexandria. The company is carrying out the work with its own men and has 10 miles of track laid. There will be one 750 ft. steel bridge. The line is being built to carry lumber, live stock, grain and general merchandise. (April 14, p. 926.)

TACOMA EASTERN.—Surveys have been made it is said from Morton, Wash., to a point near Mayfield via Tilton river, also for a line easterly to a point near the head waters of the Cowlitz river.

TIMPSON & HENDERSON.—Plans are being made by this company to build an extension from the present western terminus at Henderson, Tex., west to Tyler, about 35 miles.

RAILWAY STRUCTURES.

ABERDEEN, S. DAK.—See Milwaukee, Wis.

ARBUCKLE, CAL.—Extensive improvements are being made by the Southern Pacific to the station at Arbuckle.

ARGO, WASH.—The Oregon-Washington R. R. & Navigation Company has completed plans for building a steel and concrete machine shop and boiler house 88 ft. x 180 ft., and will probably let the contract in a short time.

BALTIMORE, MD.—An officer writes that the Baltimore & Ohio will make an important addition to the export terminals at Baltimore, Md. The plans call for putting up a freight warehouse, with a steel superstructure 34 ft. 9 in. x 230 ft., at Henderson's wharf. The contract for the superstructure has been let to the Baltimore Bridge Company, Baltimore.

BLOOMINGTON, IND.—The Chicago, Indianapolis & Louisville has completed plans and let the contract for building a two-

story, fireproof passenger station 90 ft. x 34 ft. The structure will be built of Bedford limestone and will have a red tile roof and tiled floors. The waiting room will be trimmed with brick and stone, with an arched ceiling and will be illuminated by concealed linolite lamps. The cost is estimated at $25,000. Lowe & Bollenbacher, Chicago, are the architects.

BOZMAN, MONT.—The Gallatin Valley Railway has given a contract to R. E. Stone for putting up a station at Bozman. (July 21, p. 159.)

COALINGA, CAL.—The Southern Pacific, it is understood, will put up a station at Coalinga.

COOKSVILLE, LA.—See Southern Railway & Navigation Company, under Railway Construction.

DECATUR, ILL.—The Wabash has let the contract for building a machine shop 75 ft. x 168 ft., of steel and concrete fireproof construction, to replace the one that was burned last fall.

LAUREL, MISS.—The New Orleans, Mobile & Chicago has secured land as a site for terminals and repair shops in the southern part of the city of Laurel.

MILWAUKEE, WIS.—The Chicago, Milwaukee & St. Paul has let the contract to the Wisconsin Bridge Company for two 90-ft. turntables to be installed at Milwaukee, Wis., and Aberdeen, S. Dak.

MONTREAL, QUE.—An officer writes that the improvements to be carried out at the Sortin yard, Montreal terminals, includes putting up a boarding house, an ice house, a coaling plant, a 24-stall engine house, machine shop, and boiler house, sand house, turntable, ash pits, store and oil house, and car checkers' and yard office building. Most of these buildings are now under contract to C. E. Deakin, Montreal.

NEW YORK, N. Y.—The Baltimore & Ohio has bought land bounded by Eleventh and Thirteenth avenues and Twenty-fifth and Twenty-sixth streets, New York City. Plans are being made to put up a freight station and storage warehouse on the site, for which bids are wanted up to September 10.

OWOSSO, MICH.—The Ann Arbor is preparing plans for a modern, two-story, fireproof passenger station to be built at Owosso this fall.

RAINY RIVER, ONT.—The Canadian Northern is said to be making extensive improvements at Rainy River, Ont., to include putting up a new brick station.

ST. CLARE, PA.—The Philadelphia & Reading has given a contract to the C. P. Bower Construction Company, and the work will be started at once on a reinforced concrete roundhouse at the St. Clare yard. The structure is to have 52 stalls and an 85-ft. turntable.

SALT LAKE CITY, UTAH.—See Denver & Rio Grande under Railway Construction.

SAVANNAH, GA.—The Central of Georgia is preparing plans for a gravity system for handling freight between the docks and warehouses at Savannah.

TOLEDO, OHIO.—The Lake Shore & Michigan Southern has bought about 100 acres of land near Air Line Junction, and will probably rebuild its freight yard there.

VANCOUVER, B. C.—The Canadian Pacific has given a contract to Mueller & Taylor, West Vancouver, B. C., for putting up 13 concrete bridges, 8 culverts and one arch, also for concrete abutments for 4 bridges, to be built between Mission, B. C., and Westminster Junctions.

VERNON, B. C.—A contract has been given to T. E. Crowell to build a station for the Canadian Pacific at Vernon. The work is to be started at once.

WEST WEBER, UTAH.—The Southern Pacific has started work on a new bridge over the Webber river, near this place.

YOUNGSTOWN, OHIO.—An officer of the Pittsburg & Lake Erie writes that the tracks of this company and the Erie are to be elevated instead of depressed, in order to eliminate the grade crossings in Youngstown. The improvements include putting up a new station at that place. (May 26, p. 1225.)

Railway Financial News.

CANADIAN PACIFIC.—Sir William Whyte, who will retire from the vice-presidency of the Lines West on September 30, will at that time be elected a director.

CHICAGO, MILWAUKEE & ST. PAUL.—The Chicago, Milwaukee & Puget Sound has declared a dividend of 2.3 per cent. out of the earnings of the last fiscal year. The dividend is payable as of June 30, 1911, so as to be included in that year's revenue of the Chicago, Milwaukee & St. Paul, which owns all the $100,000,000 Puget Sound stock. The initial Puget Sound dividend, 2 per cent., was declared in February, 1911.

CHICAGO, MILWAUKEE & PUGET SOUND.—See Chicago, Milwaukee & St. Paul.

CHICAGO & EASTERN ILLINOIS.—The New York Stock Exchange has listed $864,000 additional 4 per cent. refunding and improvement bonds of 1955, making the total listed $15,966,000. (July 28, p. 200.)

DENVER, NORTHWESTERN & PACIFIC.—The rumors that the Union Pacific has purchased this property are denied.

DELAWARE & EASTERN.—This property has been sold under foreclosure to representatives of the bondholders. (June 30, p. 1715; April 7, p. 879.)

EUSTIS RAILROAD.—See Maine Central.

ILLINOIS SOUTHERN.—A special meeting of the stockholders has been called for November 6 to authorize the issue of $3,000,000 first mortgage bonds and $1,380,000 income bonds. They will be used for refunding.

KNOXVILLE, SEVIERVILLE & EASTERN.—An agreement has been reached by which this property, which has been in the hands of a receiver because of a suit involving its stock, is to be taken over by W. J. Oliver, as sole owner of all its stock. Mr. Oliver has been the receiver. The road runs from a connection with the Southern Railway at Vestal, Tenn., to Sevierville, 28 miles. It is expected that extensions will be built. (April 14, p. 926.)

MAINE CENTRAL.—The Eustis Railroad, 16 miles long, running from Eustis Junction, Me., to Greene's Farm, has been sold at auction by the receiver to the Sandy River & Rangeley Lakes, a subsidiary of the Maine Central. The Eustis Railroad is narrow gage and has been operated for some time by the Sandy River & Rangeley Lakes. (August 11, p. 306.)

PENNSYLVANIA RAILROAD.—On August 5, the date of record of the August dividend, there were 69,760 stockholders, the total outstanding stock being $450,974,000. This is the largest number of stockholders in the history of the company, being an increase of 3,714 since April 12, 1911. Of the entire capital stock, 15.7 per cent. is held abroad by 10,000 stockholders.

SANDY RIVER & RANGELEY LAKES.—See Maine Central.

UNION PACIFIC.—See Denver, Northwestern & Pacific.

WABASH.—This company has sold to Blair & Co. $1,000,000 5 per cent. equipment notes.

The Chinese government has definitely decided to construct a railway between Kalgan and the city of Urga, capital of Outer Mongolia, to be completed within three years. Kalgan is now connected with Peking by a railway, 124 miles in length. The Kalgan-Urga line is considered a far more important one than the Chinchow-Aigun recently proposed, and will form an important link in the defense program as planned by Yin Chang, the Chinese minister of war. The construction of this line has been talked of for many years past, but the project was never carried out because of the lack of the necessary funds. In view of the recent developments of the relations between China and Russia, however, the Chinese military authorities have concluded that this railway is badly needed for the preserving of Mongolia to China. Engineers of the department of posts and telegraphs estimate the cost of construction at about $30,000,000, and it has been decided to begin work at once.